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# Improving Project Management Process

Helsinki Metropolia University of Applied Sciences

Master's Degree Programme

Business Informatics

Thesis

5 May 2017

Author Title	Kimmo Salonen Improving Project Management Process
Number of Pages Date	71 pages + 1 appendix 5 May 2017
Degree	Master of Business Administration
Degree Programme	Business Informatics
Specialisation option	-
Instructor	Antti Hovi, Senior Lecturer
<p>The purpose of this study was to identify the challenges in a project management process and to create an improved project management process for the Software Development unit in the target company. The target company is a software company with about one hundred employees in Finland, working with companies in the Nordic Countries, in sectors like agriculture and food industry.</p> <p>The research was conducted as a case study. Both quantitative and qualitative research methods were used in the study, using the mixed methods research design. The qualitative research data consisted of twelve in-depth interviews with the key informants from the target organization. The quantitative data was collected from old project inquiries, sent to own personnel but also to others, customers and other project stakeholders who were a part of the project work.</p> <p>The Current State Analysis provided up-to-date information about the status of the project management process in the target organization. The top three themes for further development were customer, communications and process and organization development. The two first mentioned were left out of the scope by the target organization. The researcher then fully concentrated on the process development, but also took into consideration the closely-related topics from organization development. The researcher found out that the organization was experiencing issues with the project management process and with the agile development process. In addition, the organizational development needed to be directed to support the new requirements, not to be a separate development path.</p> <p>The author has created a list of recommendations for the target organization to be used in their process development work. The list of recommendations contains nearly twenty suggested actions, including prioritized order which was co-created in co-operation with the target company's Project Managers. The author recommends that the target organization utilises agile development in their full ability and follows the development proposal presented in the thesis.</p>	
Keywords	Project Management, Project Management process, Software Development process, Process improvement, Lean, Agile

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## Acronyms

PO = Product Owner

PM = Product Manager

SM = Scrum Master

QA = Quality Assurance

CSA = Current State Analysis

POC = Proof of Concept

KAM = Key Account Manager

TPS = Toyota Production System

TQM = Total Quality Management

JIT = Just in Time

QC = Quality Circles

SIPOC = Supplier-Input-Process-Output-Customer

WIP = Work in Process

MVP = Minimum Viable Product

R&D = Research and Development

## 1 Introduction

The waterfall model has been dominant in the software development, but its limitations have driven to situation where more flexible approach was needed. Continuous delivery in software development has been a topic since approximately 30 years ago, the businesses already moved in such a high speed that the old model couldn't keep up with demand; shorter lead time, more releases and faster time to react to changes (TechBeacon, 2016).

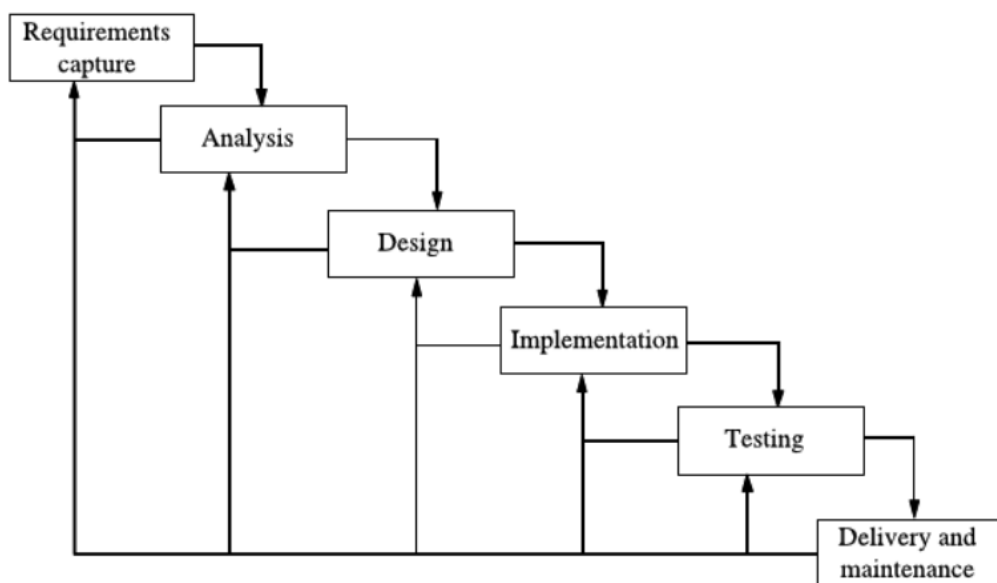


Figure 1. Software development and the Waterfall model (Holcombe 2008, p.4).

The agile software development has its origins to ease the development process, cut heavyweight processes and to eliminate the issues that troubled the software development processes. First really considerable lightweight software development methods have their roots in the late 1990's and in the early 2000. The *Agile Manifesto* in 2001 was the first time when the software development community really shared their vision in actions to work against heavily regulated and managed methods (Wikipedia, 2016). Although the meeting in 2001 were more symbolic, the *Manifesto for Agile Software Development* established common ground; compatible values and as Jim Highsmith wrote: “a set of values based on trust and respect for each other and promoting organizational models based on people, collaboration, and building the types of organizational communities in which we would want to work” (Highsmith 2001).



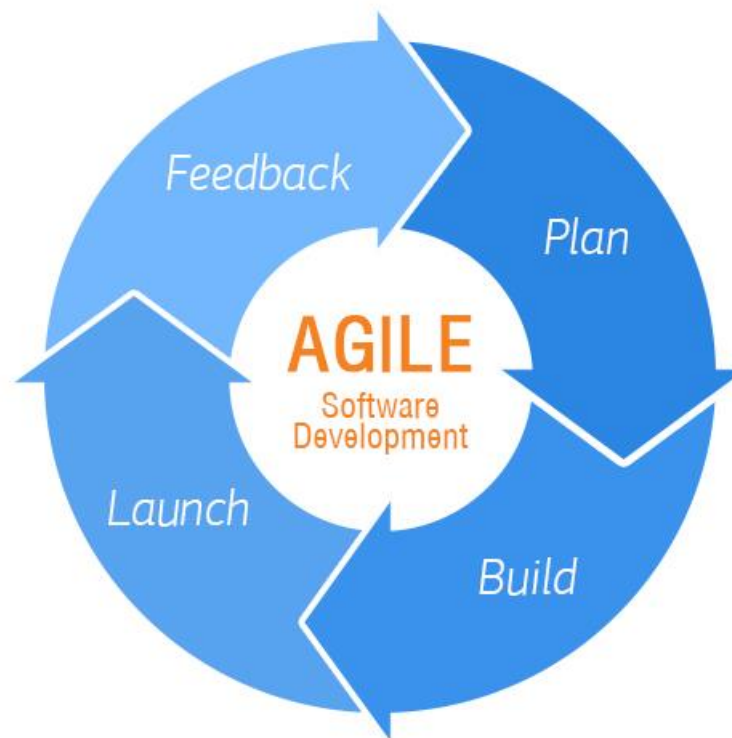


Figure 2. Agile software development cycle (A2 Design, 2016).

The participants of the meeting in 2001 in The Lodge at Snowbird ski resort at Utah did joke that they were about to make a “mushy” statement, but in the end realized that mostly it is about “mushy” stuff, values and culture, delivering good products to customers in operating environment where the people are the most important. (Highsmith, 2001).

On its own the Agile Manifesto of agile software development is just twelve principles, like: “*Business people and developers must work together daily throughout the project and Working software is the primary measure of progress*”. (Agile Manifesto, 2001). For to reach these principles more detailed development has been done and more daily processes have been developed, agile software development methods like Scrum and Kanban.

But the implementation is not that widely spread as you would think. Transitioning to an agile process like Scrum can be challenging, however, as I have noticed during the last couple of years of running software projects. The change takes time and changing the way to agility requires not only organization development but also people skills to find and guide of how to overcome years of ingrained behaviour.

So why bother? In this way, solutions are built in incremental and in an iterative manner. Agile methodologies focus on frequent and rapid deliverables of partial solutions that can be evaluated and then used to determine the next steps. Agile methodologies have been shown to deliver higher quality products in less time and thus, resulting in improved customer satisfaction. *“During their first year of using Scrum, Salesforce.com reported releasing 94 percent more features, delivering 38 percent more features per developer and providing over 500 percent more value to customers compared to the previous year”* (Mountain Goat Software, 2016).

This paper studies what are the issues in the target organization’s software development process from project management point of view, searches and utilizes suitable processes and gives guidance of what should be done in the target organization via list of recommendations.

## 1.1 Overview

This thesis will endeavour how the target organization can improve its project management process to secure its long-time performance in changing market. The transfer from waterfall model to agile development in Software Development unit has happened several years ago but the implementation of fully operational project management process has not been completed or developed with sufficient resources. This thesis will pinpoint the non-functional process steps and create a proposal for enhancing the project management process will be made.

## 1.2 Business Challenge

The Business problem is untapped assets in Project delivery; organization has big amount of capable personnel that aren’t used in optimal way and inefficient project management processes that needs to be updated. This has led to situations where there has been challenges in projects with for example change management, that has led to situation where the delivery date to customer has been impossible to achieve.

The project delivery and relating project management process development means in practise that it will change the way of working in the organization, for example moving from tightly limited roles to roles with capability and requirement to handle

multidimensional and advanced software development tasks. To succeed in this requires a tight co-operation in all organization levels and organised implementation.

In a couple years back company started to use agile methods in a couple of pilot projects. The agile model in use is not any specific methodology like Scrum or Kanban, but own best practises picked from several frameworks. The model in use has made the software development process more efficient, but issues still exists, like:

- **Incomplete tasks within a sprint:** Many times specifications are too light or during the sprint it is found that there are unknown connections or interfaces which requires more work than estimated – Resulting to sprint failure as the planned tasks will not be ready as promised
- **Product Owners (PO) change priority within Sprint:** New requirements or pressure from stakeholders or customers that requires immediate actions from development team – Resulting again to sprint failure as planned work needs to be postponed and new ones started
- **According to Scrum framework there should be only one PO:** Decision making and getting answers can be difficult as there can be two person acting as a customer to development team
- **Product Manager (PM) is not prioritizing the tasks:** For the development team to be able to plan the next tasks and design new features accordingly, it is most important that the backlog list is constantly updated with the latest information so that it is going so as the product development roadmap is desired
- **Backlog list is not updated:** For the development team, to be able to plan the sprints and design new features accordingly, it is most important that the backlog list is constantly updated by the PM or PO
- **Work needed to do for the production environment:** This is nearly impossible to estimate; how much time will be needed in the sprint for production environment. This is important to notice as it have had consequences, basically a lot time away from the project development tasks
- **Issues with schedules:** Teams are not meeting the set timetables; production environment requires attention, chances in specifications, chances in sprints content, definition of done vague
- **Development teams are not fulfilling the requirements/set targets:** Similar issues as with keeping up with the schedules; chances in specifications, chances in sprints content, definition of done vague

- **Quality Assurance (QA) is heavily loaded in the end of the sprint:** Incremental development doesn't work as it should, too big "blocks" tried to develop and in the end of the sprint QA doesn't have the time to work – features are needed to cut even smaller pieces for the development process
- **Missing specifications:** Hard to design next tasks or sprint content as the entirety is unknown
- **New tasks during the sprint:** Need to do extra, or the content of the sprint is needed to change – Most times resulting always into sprint failure
- **Not familiar what is the role requirements:** Specially in elsewhere in the organization (excluding development team), for example what is required to handle when acting as a PO or PM
- **Missing collaboration with Helpdesk:** Development team is missing the feedback from the product helpdesk and/or Helpdesk team is missing the information regarding the product development
- **Definition of Done:** What is good enough, is the development team using too much time to finalizing the features, "polishing the diamond"
- **Missing technological solutions:** Missing tools and knowhow how to automatize and create the development work more efficient (for example testing automation and code review)
- **Tasks going directly to developers:** Disregarding the chain of command and agreed process steps, causing unnecessary confusion in the development team
- **Incomplete usage of the tools:** Current tools for example for project management could be utilized to more efficient use (for example JIRA). Instead of that several different formats and programs are used
- **Project Manager is missing important information regarding the project:** Missing vital information, requirements, news, resource situation etc. In-house collaboration needs to be more open and the information should not be held for some roles only

The above mentioned issues normally lead to situation where the costs of the project have increased and the project delivery will be delayed; just a couple of practical examples to display. Thesis related development work should provide tools and processes to help in every day operations.

### 1.3 The Target organization

The context of the study is a Finnish software company which is specialized to create software and solutions to customers and companies in the primary production, food chain or closely linked to it. It is the leader in its line of business in Finland with a decades of experience. Company is well known and its competence is recognized both in Finland and in the Nordic countries. At the moment company's customer base is mostly consisting from customers in agriculture, most of the Finnish agricultural entrepreneurs are using some of its software. Although company has been in the market for a long time markets have changed rapidly in recent years. Global changes in the economics are affecting to its stakeholders. As many other industries regression has hit hard also to agriculture and all operators in this sector are confronting major challenges. These challenges and problems are reflecting to the company, many of its customers are decreasing their product development and service maintenance costs. Also the authorities are considering to open Finnish markets to other companies, both national and foreign; to be able to provide certain, earlier exclusive, services.

Study focuses to the project management process development, process what is concerning basically in some way all the units in company, except customer services for external customers. Most of the employees (70%) are working with the software development duties via company's own product development projects or via customer projects. Even when maintaining the current range of own products; it is done nowadays by following more and more agile development and project management principles.

Company's other units like IT, which provides for example services like cloud services or server capacity are closely linked to software development process. When certain special, concerning IT services is required, suitable resource is allocated to project from IT department.

Transformation from using waterfall model to agile methodology has been running for a couple of years, although some customers still prefer waterfall model but are starting to be in minority. As the software development services are creating the major part of the revenue it is crucial to have that process in top order.

<p><b>Limited company established in 1986</b></p> <p><b>Net sales 9,6M€ in 2016</b></p> <p><b>Employees approx. 110</b></p> <p><b>Average working years in company 10,5years</b></p> <p><b>Major part of the revenue comes from Projects and Services</b></p>
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Figure 3. The target organization summary.

#### 1.4 Objective, Scope and the Output of the Study

Thesis Objective is to enhance project management process by eliminating unnecessary phases, improving vital processes in the project delivery and discover ways to improve efficiency and collaboration in the projects. Thesis will concentrate into issues that are tightly connected to project management process, especially during the project, from the Project Office and the project team point of view.

Solving this is important because company needs to ensure its long term survival. That requires enhanced and more efficient use of the resources and the best suitable processes that supports all the needed functions on all organization levels during the project or program development life cycle.

Output of the study is a list of recommendations; for the use of the whole organization for project management development and for the development of other closely related processes like personnel development. Recommendations provide information about needed development actions and the way they could be solved.

## 2 Method and Material

This section explains what choices and why these choices have been selected in this study. For the data collection and analysis, the main source was employee interviews. Regarding the study and the business problem, interviews where seen as the most suitable way to collect data.

## 2.1 Research Approach

There are several research strategies for researchers to choose from. Possible research approaches to be used are for example, survey, action research, experiment and ethnography. In this chapter it is explained why the researcher has ended to certain strategy, why it was chosen and what are the arguments for that (Saunders, Lewis and Thornhill, 2016, p.209). Research in overall was made with tight co-operation with the case organization, persons with daily connections into project work and other suitable stakeholders.

Research methods are different ways to collect and analyse found empirical evidence. Methods have their disadvantages and advantages, depending on three conditions. First condition, the type of the research question. Second condition, the focus on contemporary as opposed to historical phenomena. Third condition, what is the control that the investigator has over the actual behavioural events. Case studies are the preferred method when “why” or “how” questions are dealt and the researcher has small capability to control the events and the focus is on within real life context on contemporary phenomenon (Yin, 2009, p.2).

The case study strategy also has considerable ability to generate answers to the question “why” as well as “what?” and “how?” questions (Saunders, Lewis and Thornhill 2012, p.179).

We would argue that a case study strategy can be a very worthwhile way of exploring existing theory. In addition, a well-constructed case study strategy can enable you to challenge an existing theory and also provide a source of new research questions. Case study research is likely to prove to be intensive and demanding (Saunders, Lewis and Thornhill, 2012, p.180).

After investigating available research strategies, researcher ended to conclusion, that the most suitable research methods would be a case study. As noted by Yin (Yin 2014, cited in Saunders, Lewis and Thornhill, 2016, p.184), a case study is in-depth inquiry to phenomenon or topic with real life setting. The case study strategy has the capability to generate insights from thorough and comprehensive research into the study in its real life context, resulting rich, empirical descriptions and to the development of theory. To be able to achieve an in-depth inquiry and a comprehensive flow of analytical data, a case study method could offer the opportunity to use a mixed methods research design,

which opened new possibilities to researcher to utilize. Case study research can use some combination of for example, interviews, questionnaires, documentation and archival records; just the ones that the researcher planned to use in the research (Saunders, Lewis and Thornhill, 2016, p.185-186).

Creswell (2007 p.74) states that *“a case study is a good approach when the inquirer has clearly identifiable cases with boundaries and seeks to provide an in-depth understanding of the cases or a comparison of several cases.”* Case study object is generally a bounded system, like a process, an event or activity. Like in this case, subject is a process that needs to be clarified, so a case is found (Creswell, 2007, p.120).

Data collection activities for the case study includes several activities and steps. In case study common data collection issues are interviewing and observing issues. An extensive data collection can be used; documents like about old lessons learned, surveys, observation and interviews. This extensive, multiple sources of information in data collection provides detailed in-depth picture of the entirety. Information can be recorded via field notes, interviews and observational protocols, stored in computer or for example in field notes (Creswell, 2007, p.121).

Characteristics of the qualitative research approaches like case study contain several distinctive characteristics. In the case study the focus is on creating in-depth description and analysis of the case, providing a deep understanding of the case. And the discipline background can be drawn from several backgrounds, like law, political science and psychology. The unit of analysis could be studying a program, an activity or an event; the data collection then using multiple sources like documents, interviews and observations. The analyse of the data through description of the case and themes of the study as well as cross-case themes could be possible. Resulting then to a detailed analysis of the case in written format (Creswell, 2007, p.78-79).

And as the researcher is planning to use case study but to be more specific, a qualitative case study. The difference in qualitative and quantitative methods contains *quad pro quo* between depth and breadth. Using quantitative ways, standardized questions limit replies on pre-set categories, thus giving less depth and breadth. On the positive side this enables the measurement of the reactions of many participants to a determined set of questions, providing comparison and statistical compilation. On the other hand, qualitative methods usually give comprehensive in-depth data from the limited sources.



Because of its in-depth nature qualitative method was selected to be used in the case study (Patton, 2002, p.227).

The methodological choice, between quantitative and qualitative, did create some unwanted boundaries on conducting the study, so the choice needed to re-examination as the researcher wanted to use some quantitative material from the surveys as well as qualitative material from the interviews and observations. The solution was to use mixed methods research design. This combines the use of qualitative and quantitative data collection techniques and other analytical procedures. Mixed methods research design can use abductive, deductive or inductive approach for the theory development. Approach for this study is deductive (Saunders, Lewis and Thornhill, 2016, p.169-170). Multi-method in the other hand as an available method was out of the questions as it does not mix qualitative and quantitative study's. (Saunders, Lewis and Thornhill, 2016, p.166).

## 2.2 Research Design

The research design is aiming to explain steps and phases that the study used to achieve the ultimate goal; improved project management process and document it so that it creates a list of recommendations for the target organization. Research Design with its phases are presented in figure 4.

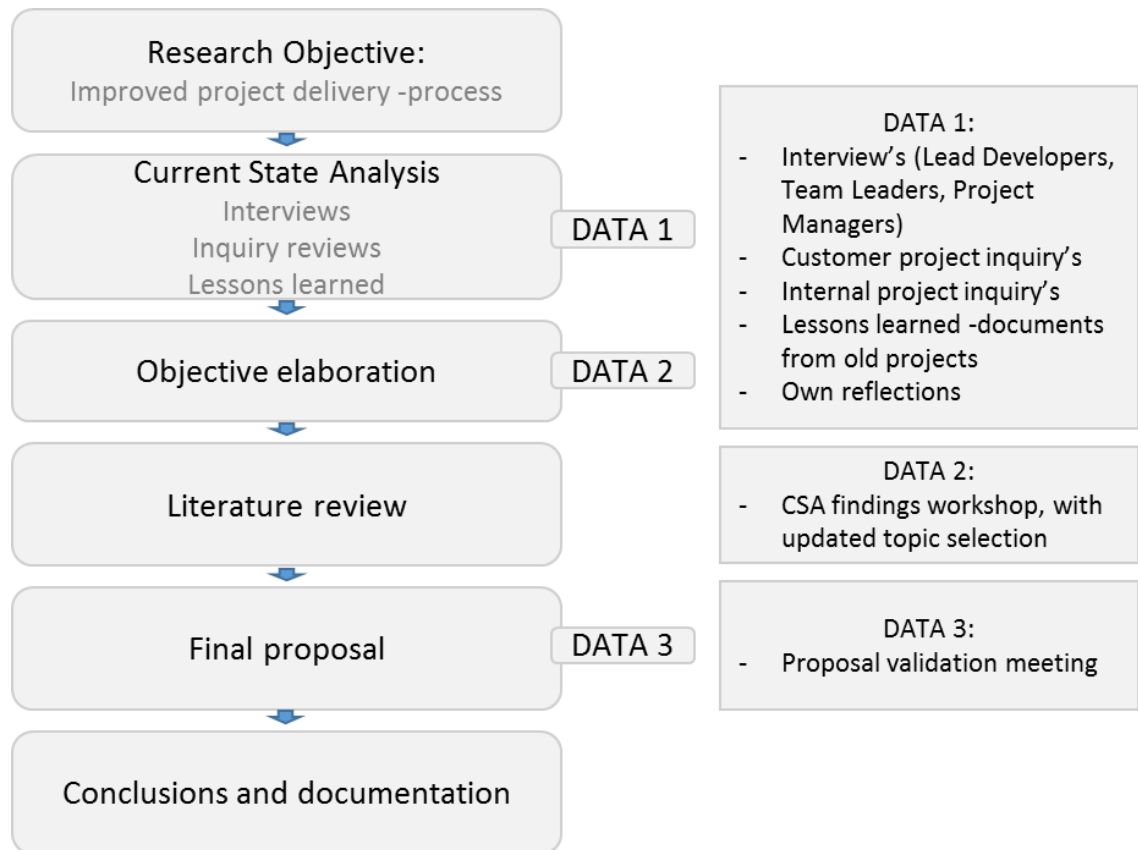


Figure 4. The research design.

The research design consists of five phases. The study started with collaboration with the target organization, to find and resolve the true research object. In this phase there was a couple of unofficial meetings with Project Office Manager, where the suitable target was discussed and developed. The scope was then finally set to discovering the untapped assets in the Project delivery.

Next phase was the current state analysis, on which the majority of the data was collected through interviews, interviewing the key informants of the company. Additional information in this phase was sent inquiries about project delivery and project management process and lessons learned materials from finished projects dated two years prior to study. Sent inquiry's contained quantitative and qualitative information received from customers and employees. CSA phase also provides description of the current project management process as a starting point and accurate information about challenges in the current process.

After the CSA phase the target organization was eager to hear the analysis results as there had been some pressure for overall organizational development. Some parts of

that development project where partly connected to the thesis, so the decision was that the thesis scope needed amendments. Objective elaboration meant that there was a workshop where the findings of the CSA analysis were presented and based to those findings and other development activities starting in the company, workshop participants wanted this Thesis work to concentrate into the project management process, ignoring mostly the two biggest themes which were found during the CSA.

On the literature review stage researcher concentrated to study materials that are produced from the subject; project management and software development related suitable topics that could be beneficial in here regarding the case from the software development point of view. There is a huge amount of publications for example about Lean philosophy, agile development methodologies (for example Scrum, Kanban, Scaled Agile Framework (SAFe) and DevOps) and Prince Project management methodology. This phase with previous phases creates more solid understanding and possibility to create the final proposal.

The final proposal consists of a list of recommendations that are beneficial in the project work and in the project management process. Recommendations are mostly concentrating to the project work, with some side notations to other process phases during the target organization's project work process, like competence development. Proposal was presented in a meeting and some selected parts were chosen as a starting point for the development work. Proposal is concentrating how project work could be more functional and efficient, but also to be suitable to other process related functions in the organization for helping on a wider implementation and on the organizational development.

After the final proposal was presented all the required documents where handled to the case organization, the further development work can continue as it is desired to. All additions and details to information where updated or added to documents and Thesis was updated according to feedback from the proposal validation meeting. This document is built so that for all the steps, from starting the research to finishing it, the necessary information is found from this document. Documents can be reusable, making the research replicable later if needed.

### 2.3 Data Collection and Analysis

The main source of this specific CSA was interviews. Considering the target organization and the business problem, interviews were seen as the most suitable way to collect data, although more efficient and less time consuming way could have been sending out qualitative survey. Thus, interviews were conducted in order to get the most out from the interviewees, exploiting normal and familiar situation, just like operation in daily meetings. Interviews were semi-structured qualitative interviews. Semi-structured content is suitable for interviewing different people for example in this case where they have different roles and responsibility areas, thus the interview can be altered along the event; it can be rapidly adjusted to current situation and interviewee.

King (2004) highlights how qualitative interviews differ from this approach in that their key aim is to access the interviewees' understanding and views rather than seeking to standardize responses. In qualitative approaches, typically interviews are semi structured, or unstructured, encouraging the interviewee to talk at length around a subject, and shape the direction of the interview as necessary. (Cassell, 2009, p.503).

The interviews were arranged at the target organization's premises. The duration of interviews varied from 40 minutes to one hour and thirteen minutes. In case further development needs should occur later on, similar interview could be conducted again and same semi-structured question-set could be used again.

Interviewee list were not published and interviewed persons were not revealed to the other interviewees. But considering the type of this research high anonymity was not seen important. This research is not for example about sensitive data or certain individuals, if it would, then different precautions should be in use. It was expected that interviewees would tell the same story even though total anonymity wasn't in use.

The interviewees were selected from 100 employees, their age profile was from 30 to 55. Interviewed were both male and females. Selected personnel were as listed; seven Team Leaders (team members ranging from 6-15), three Lead Software Developers, one Project Manager and one R&D/Architect Team member, with average of fifteen years of work experience from software development sector. These employees were selected because their job roles are interesting considering the business problem and research question, as they are attached to project management process in one way or another. These interviewees have years of experience of software development and up-

to-date information of the sectors demands and the constant change on it. These individuals have also accurate snapshot of the organization and its capabilities, especially over their own resources; resources that are on major part on the project delivery process.

Nearly all interviews were recorded with laptop and the recordings are stored in the target organization's network file drive. Folder made specific just for the development project with access granted only to researcher. Interviews were recorded to store all the discussed data, not only the one what the interviewer managed to collect but also to have the possibility to return to situation and to ensure that the content was understood correctly and properly documented.

Several sources of data are used to ensure the quality of findings. This provides more information to process but it also ensures the reliability and the versatility thus creating more fertile and secure background information for research to be based. One other source of data for the CSA, is quantitative questionnaires with some qualitative open ended questions. This method will be used as an addition to get information from wider group but also to have continuum on company's' yearly and project specific web inquiry's. As well as yearly project management inquiry the project specific inquiry follows always the same question pattern. As the quantitative inquiries are also used to collect data, this also means that choices by Saunders, Lewis and Thornhill (2009) needed alteration; not only multi-method but also mixed-method. As the inquiries contain both quantitative as qualitative questions.

	Data type	Data source	Date & Approach	Recording	Purpose/Focus
<b>Data 1</b>	Interview	Team Leader 1	9.2.2016 face to face	45min: Notes	CSA interview
Current State		R&D/Architec -team member 1	19.2.2016 face to face	70min: Notes	CSA interview
Analysis		Team Leader 2	22.3.2016 face to face	57min: Recording	CSA interview
		Team Leader 3	23.3.2016 face to face	54min: Recording	CSA interview
		Team Leader 4	29.3.2016 face to face	73min: Recording	CSA interview
		Lead Software developer 1	14.4.2016 face to face	56min: Recording	CSA interview
		Team Leader 5	12.5.2016 face to face	66min: Recording	CSA interview
		Project Manager 1	12.5.2016 face to face	63min: Recording	CSA interview
		Lead Software developer 2	16.5.2016 face to face	56min: Recording	CSA interview
		Team Leader 6	17.5.2016 face to face	38min: Recording	CSA interview
		Lead Software developer 3	23.5.2016 face to face	59min: Recording	CSA interview
		Team Leader 7	23.5.2016 face to face	51min: Recording	CSA interview
	Internal Documents	Projects Lessons Learned			
		Yearly project web-questionnaires			
		Project specific web-inquiry's (after project handover to customer /maintenance-team)			
<b>Data 2</b>	Workshop	Project Managers 1-2	1.9.2016	60min: Notes	Comments/Approval
Objective elaboration		Business Unit Directors 1-2			
<b>Data 3</b>	Meeting	Project Managers 1-4	27.3.2017	57min: Recording	Proposal validation meeting
Final proposal					

Table 1: The data collection.

## 2.4 Validity and Reliability

The reliability and validity, components of ensuring the quality of the research. Reliability is referred to the data collecting techniques, where analytic procedures should produce coherent findings if the study would be repeated on an another time or replicated by another researcher. The researcher needs to be methodologically rigorous on the selected way and carry the research out avoiding the threats to reliability of researcher's conclusions and findings. Many threats to reliability exists, for example participant bias. Where in for example, in interview situation, conducted in an open space can affect to the interviewee to give false answers in a fear of being overheard by others (Saunders, Lewis and Thornhill, 2012, p.192-193).

Validity and its many forms have been identified to also ensure the quality of the research. Forms of the validity are for example content validity and internal validity. Internal validity can be seen when the research demonstrates a causal relationship between two variables. Threats to internal validation is for example Maturation, where a change coming outside of the study impacts to its participants, for example management training makes participants change their responses during a subsequent research stage (Saunders, Lewis and Thornhill, 2012, p.193).

All the threats to the research work have been tried to minimize or fade out. The credibility and the trustworthiness is achieved by understanding the challenges in the process of the research work and avoid situations where the risk is high. Threats like researcher error, which means situations where any factor that changes the researcher's interpretation could change the result is in this case handled in for example CSA phase so, that the main source materials (interviews) were recorded. Also field notes exist, so the researcher was able to go back to interview situations to ensure that there weren't any misunderstandings. The way interview materials were handled reduced also the risk of researcher's bias, the used way ensured that researchers own disposition or subjective view didn't get in the way in participants' responses (Saunders, Lewis and Thornhill, 2012, p.192).

### **3 Current State Analysis**

On the current state analysis phase the researcher studied and reported the status in the target organization regarding project management process in the Software Development unit. What seemed to be working and what sectors needed some attention via the findings for example from personnel interviews.

#### **3.1 What is Current State Analysis**

A current state analysis (CSA) is a phase where the current situation is thorough and systematically investigated. This phase helps to understand the requirements of the task or the project. In this phase collecting information about the business needs, for example primary pain points and the business processes helps to understand the issue on hand. The current state analysis document is mostly used as a reference or as a foundation for example wider business analysis or in process development project (BA Times, 2012).

The main purpose is to present current, "as is" state. Describing the current business processes, stakeholders, business functions and the present business context. Current state analysis lists the main attention needed points within the investigated business processes and tasks within them. Document should also point out the areas where the change is needed (BA Times, 2012).

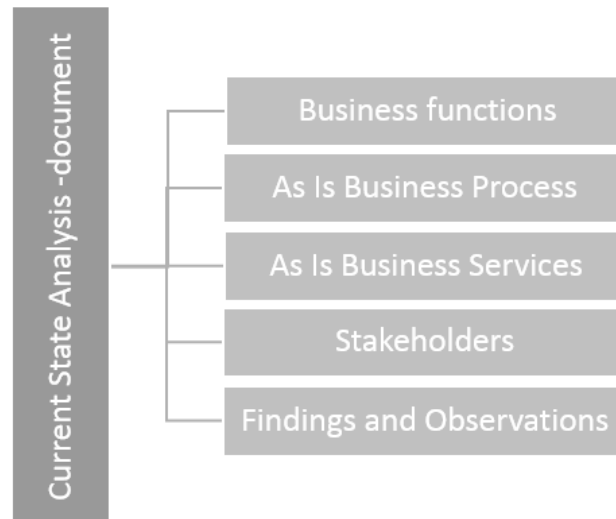


Figure 5. Example of the current state analysis document contextual structure (Aotea Studios, 2010).

### 3.2 Current State Analysis Overall Findings

Overall several different topics arise during interviews. Each arisen topic that was brought up in the individual interviews, was given a score of one, and in the case if the same problem repeated in some other interview, the score of the topic was incremented by one. Based on the results of the interviews the researcher found 15 different themes'. Themes were created to help on collecting similar issues under understandable categories and for easier data processing.

The three most scores received topics were Customer, Communication and Project management process development.



CSA themes	Score points	Total
Customer	1+1+1+1+1+1+1+1+1+1+1	12
Communication	1+1+1+1+1+1+1	8
Process Development	1+1+1+1+1+1	7
Organization Development	1+1+1+1+1+1	7
Leadership	1+1+1+1+1	5
Trust for the heroic performance	1+1+1+1	4
Management	1+1+1+1	4
The usage of tools	1+1+1	3
Organization of the tasks	1+1+1	3
Challenges in time estimation	1+1+1	3
Modification of time estimates	1+1	2
Engagement	1+1	2
Organization culture	1	1
Working spaces	1	1
Recompensing	1	1

Table 2. Current state analysis findings put in coherent themes.

After the CSA phase the target organization was eager to hear the analysis results as there had been some pressure for overall organizational development. Some parts of that development project were partly connected to Thesis, so the decision was that the thesis scope needed amendments. The objective elaboration meant that there was a workshop where the findings of the CSA analysis were presented and based to that findings and other development activities starting in the company, workshop participants wanted this Thesis work to concentrate into the project management process, ignoring mostly the two biggest themes which were found during the CSA. Request was that the researcher would concentrate into Process development with taking into consideration the suitable issues from Organization development theme as many topics under it are closely related to project work.

From the themes' (table 2), for example communications as a topic has arisen also in internal personnel questionnaire and it will be one development topic for the whole company, not only an issue in project management. Communications as a topic will be taken care in an another development project, so hence it will be left out from topics of this research case study. Another topic that will be dealt in another way is Customer. Researcher received feedback that working with the closes partners has some issues in for example in communications, collaboration and in decision making. As during the thesis work, target organization changed the scope of this case study; the most scores received topics wanted to be left out and the focus were set to project management and to process development from the Project Office and from the project team point of view.

These action points are highlighted in the process flow which describes the higher level project steps in the target organization (figure 6.).

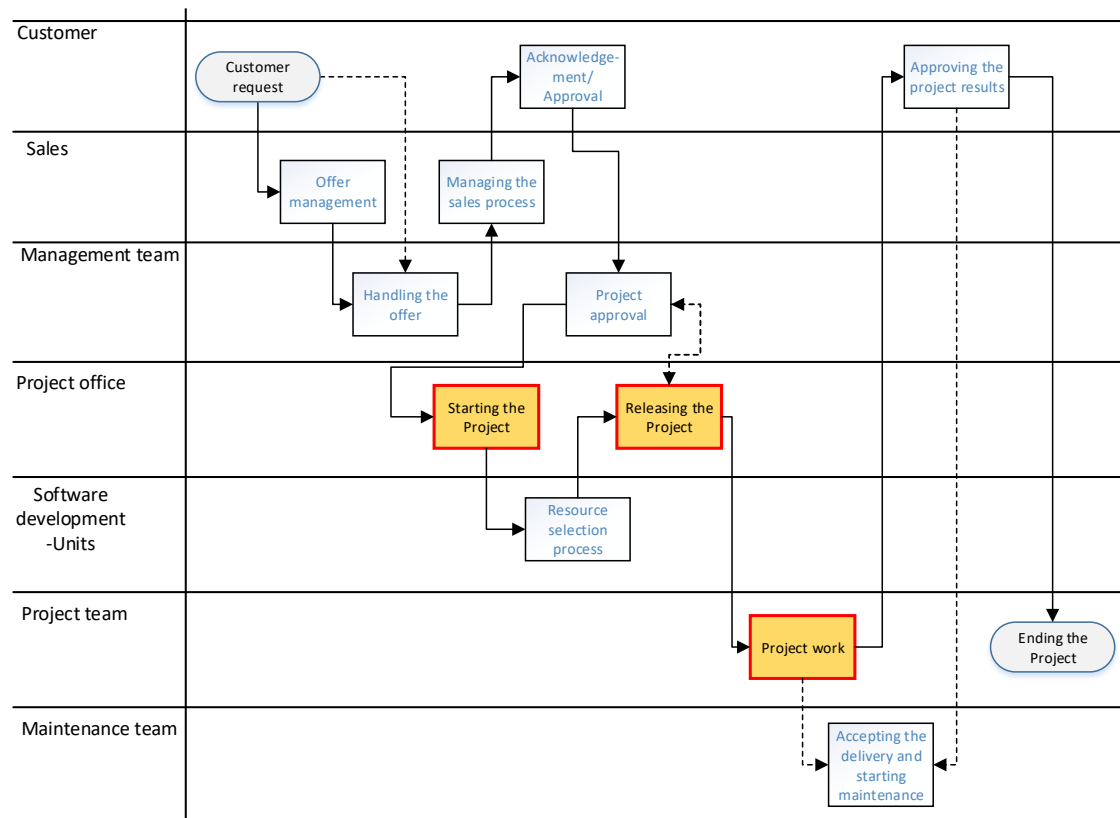


Figure 6. The target organization software project overall process flow.

Found CSA findings that were collected during the study phase, interviews as the main source, are listed below. Including the phases before, during and the end of the project – phases during the projects live-cycle; from the project sales to ending the project. On this phase the researcher found some points of pain but in the other hand, listed also numerous functions that were in good shape and functioning as they should.

CSA findings phase by phase:

- **On Sales phase**

- **Projects sold on too low resource level:** Not to underestimate on regular basis the work amount on the estimates created for the Sales

Interviewee no#5:

“Too tight timetable already before the project, project sale is on unrealistic line – Management is not aware of the entirety, know-how of the developers is not utilized.”

- **Projects started with not enough resources:** Linkage to above but also that all the needed resources should be available when the work starts, not to bring more developers individually on occasion to project team

Interviewee no#11:

"Exploitation of competencies should be better, now "dictation politics"."

- + **Working internal project resource search process:** Process that encourages employees to apply, everybody is treated equally and the process is open to everybody
- **Starting the project**
  - + **Existing specifications – Already created during the sales process:** No need to build everything from scratch for the project, enables more efficient start for the team members to get working
  - **Have to start with unrealistic timetables:** Team sprint might be hard to find and achieve when the original goal is unrealistic; how to motivate people to give their best when the expectation/common knowledge is that the goal is impossible
 

Interviewee no#5:  
"The magic word: "Agile", doesn't necessarily mean faster working, especially without commitment from everybody. All persons that are related to agile project way of working must change, not only the developers."

Interviewee no#6:  
"Honesty of the content is missing, approving the unknown."
  - + **Familiar techniques in use:** Known technology stack and possibility to select technology that solves and fulfils the requirements
  - **No time get organized as a project team – to be The project team:** Visible progress expected from the day one which is hard to achieve without designs (for example UI mock-ups) or properly working development environment
 

Interviewee no#6:  
"There should be more buffer time, the execution is started too quickly. Lighter start and then gradual acceleration."

Interviewee no#9:  
"Need more time to get to know how the development should be done, sometimes feels like you are just dropped into the deep side of the swimming pool."
  - + **Created project models bringing needed structure to the project during its live-cycle:** Templates, guidelines, instructions; helping on to getting the organization work as a project organization should work
  - **Customers are not acquainted to collaboration required by the forthcoming project work:** Customers don't know how to work in a project and what are their responsibilities
  - + **Internal project team kick-off event is organized and held professionally:** Usually the team is invited to an event where the subject is

handled from the all perspectives; financial, customer, operation model, participants etc.

- **Project kick-off event with external and internal participants are not organized every time:** Despite that normally internal project kick-off is held, there isn't always event with the customers which could provide excellent starting point to collaboration in the project
- **Project models are in too high-level, more concrete actions needed to guide through project:** Personnel unfamiliar working in projects or leading them. Personnel find the current project models to be vague, more concrete examples are needed

Interviewee no#2:

"Work that requires long-span actions is not done in the company. Eager on implementations, but after the excitement nothing happens, and no supervision or expectations."

- **No general information available from the ongoing projects:** There is a small amount of information available on projects, no news or information about the situation on a regular basis
- **Have to give too exact project task descriptions to team members (personnel stuck in old way of doing):** Running the project as Project Manager or scrum master phases issue that the initiative capabilities are weak or non-existent as in the old world things were different
- **Insufficient follow-ups of the budget details:** reporting the financial figures is experienced to be awkward and not even demanded by the steering groups (internal)
- **Insufficient follow-ups of the time information:** No common way to report hours or collect that information; needs to be collected from several sources and also, different time reporting requirements exists internally in the company

Interviewee no#11:

"Speed to react should be better, when something changes, it should affect also to remaining timetable."

- **Utilization on competences insufficient:** No harmonized way to collect qualifications and technical skills and no system to search these
- **No easily found models of how to run projects and how to work in a project:** Down to earth instructions and guidelines are missing, both from the new Project Managers, part-time Project Managers and from the project team members itself

Interviewee no#3:

"There should be documented the required first steps, so that there wouldn't be so many reinventions and the activities would draw up."

- **During the project**

- **Existing technical solutions are not utilized, everything is built from the scratch:** No organized process to list the available in-house solutions or practise to check first could there be already existing solution for the purpose – target organization self-build or commercial one
- **Lack of suitable internal tools, like for example testing automation and code review:** To create improved entirety, faster flow, less manual work and more/faster releases of new features, new tools and processes are needed
- **Project team members have to work other ad hoc work besides the project tasks:** Team members time isn't always available for working with 100% usability rate in the project – There are too many tasks that only certain individual can solve or their actions are needed (employee dependency)
- **Project team members may need to maintain existing product during its development project:** If problems come up at the production environment, many of the developers need to use their time to investigate and solve the issues as soon as possible – unforeseeable time away from the development project, resulting to sprint failure in many occasions

Interviewee no#9:

"Other assignments have caused too much pressure, not have been the possibility to concentrate fully into project."

- **Customer commitment to project can be weak:** Customers may have arrogant approach, some may have been forced to participate, others have already too much to work with and they are placing the target organization so that they see themselves better in everyway

Interviewee no#2:

"There should be an objective to achieve true collaboration with the customers, mutual commitment and trust."

- + **Positive development for the project team members is to be able to work only with the project tasks (old responsibilities won't follow to project anymore):** There has been some internal organizational development actions where the project workers are tried to give the possibility to work only in the project, old tasks and responsibilities are transferred from them

Interviewee no#7:

"Problem in the company; development of new or maintenance – which one to select. Developers have been transferred here and there according to needs."

- **Not enough feedback of the performance during the project to team members:** Organizational culture is not used and comfortable to give feedback to employees for bad or good performance
  - Interviewee no#12:  
"Employees should understand that arriving into workplace is not justification to salary."
- **No flexibility in the development team member roles:** In some cases, some of the organization members are not ready or willing to change into more agile way of doing things so that one individual would act in several roles during the development process
  - Interviewee no#5:  
"Development work is constant process; it needs also courage to make the changes."
  - Interviewee no#8:  
"No knowledge to do anything else. Should not be so stiffen into roles, should be understanding and capability to see the bigger picture."
- **POCs' are not used often enough:** Proof of Concepts are good way to explore suitability of the new technique or solution – Even in a customer work, possibility to have deeper customer relationship and more sales
- **Old lessons learned are not systematically utilized and used:** The information gathered is not easily found or used systematically in the future
- **More project specific information should be shared internally:** No periodical information about the progress or other project related news like coming releases available for the employees to read
- **No common ways to manage the projects progress:** Full-time Project Managers are using their own practises, own templates or documents but for temporary project leaders, they find it hard to know what to report and how
  - Interviewee no#8:  
"Project culture is not mature, organization doesn't understand and know how to work in projects."
- + **Possibility to affect to technical platform and technical choices:** Project members have a great possibility to search and select technical solutions which can help to create the best results for the purpose
- **No clear explanation of responsibilities of Team Leader versus KAM versus Project Manager:** As the whole organization is not that well aware of the procedures and details of the agile development and how it works, there is challenges to know whose responsibility is to take care of what during the project

Interviewee no#10:

"Balancing with the substance, are we all going towards the same goal?"

- **Different courses of actions between projects:** Project management is not harmonized – practises vary and can cause unpleasant consequences to other Project Managers or project team members

Interviewee no#6:

"We should be more honest. If timetable is impossible – it doesn't usually cause any actions. Ostensibly working mechanism in use."

- **Collaboration with certain customers can be challenging:** No good cooperation, hard to get answers, missing presence from the project meetings, bad communication, and no know-how how to work in a project as a just few examples to mention.

Interviewee no#4:

"Customer doesn't have the time; no specs from the customer - time estimations then impossible to make."

Interviewee no#11:

"Occasionally there has been situations where there has been doubt that is the customer really awake, understanding their own requirements."

- **Ongoing unnecessary Micromanaging:** Software developers can receive mixed signals from different persons in the chain of command and might receive completely opposite information or have unnecessary managing from persons that don't have all the needed information in their awareness

Interviewee no#8:

"Certain churn here and there, going on half-asleep."

- **Missing answers from the management:** Leaders should be available to seize the questions or flaws and do their best on helping and solving the issues on the projects when required to do so
- **No active promotion of project culture in the target organization:** There has been some kind of implementation of the project culture and the way of working in projects, but it is missing the real implementation to entire company and continues contribution of the subject

Interviewee no#8:

"Missing project briefcase or similar, upper level control is missing from the organization."

- **Missing shared ways of working in projects:** There can be big differences on requirements on how to work in the team; working procedures, code reviews, time reporting etc.

Interviewee no#3:

"Waterfall going-on still internally."

- **No utilization of older and useful features and functions:** As there is a little information of the products technically, there is no information what useful solutions they might contain – And as there isn't regular news or information about features that are built in new projects, there are recurring needs for already existing solutions and overlapping code development
- **Not enough general feedback during the project:** Giving feedback, positive or negative is seeming to be difficult in the target organization – project team members would like to have more feedback how they manage and all kind of general information concerning the project (feedback from the other stakeholders and others related to project)

Interviewee no#9:

"Customer might have different impressions, but there hasn't been enough communication between parties."

- + **New "fast-reward" model is a good tool for managers:** Promotes new organizational culture where there wouldn't be strange to talk and give rewards of a job well done
- **More open project information should be shared:** All the projects should have their own page in the target organization's Intranet where there could be described for example the technical platform, solutions technical selections and other general information like next features and milestones
- **No active additional sales / sales process during the project:** No culture or habit to sell additional features or additional projects during the projects – As this would be excellent place to show the stakeholders other technical solutions of how they could develop their business with the target organization

Interviewee no#2:

"Must also have the courage to say no, when extra work is pushed to company and should have the capabilities to sell right solutions to customers."

Interviewee no#5:

"We are good on destroying our own accomplishments. Everybody is not going into the same direction, missing the shared goal."

- **Missing understanding what is their role requirements, for example Project Manager have to work in some cases as a Product Manager or even as a Product Owner:** Being agile doesn't mean that certain group is working so, it means that also other closely working members need to adapt and learn the new way of working – Know and understand the role requirements, work and act as they should according to their responsibilities



Interviewee no#12:

"People on the different roles should communicate more between each other's in projects, especially testing and design."

- **Customers are not acquainted to collaboration required by the project work:** Customers don't know how to work in a project and what are their responsibilities

Interviewee no#6:

"Agile procedures fell often because the customers don't have capabilities nor personnel to attach to collaboration."

Interviewee no#8:

"Customers should also understand what investments the projects are needing."

- ***Project handover phase***

- **Handover phase needs to be more organized and managed:** Project team is usually left waiting in a "no man's land", a space where nobody is wanting to take the responsibility and project team members are kind of left alone to wait further actions
- + **Implementations have gone well:** When there has been beforehand organized detailed plan of the implementation the target organization has received praising marks from its customers – Also here have been included the plan of how the transfer from development phase to production phase will go, all the needed stakeholders included already on the planning phase

- ***Ending the project***

- **Lessons learned session not held every time:** Should be normal procedure that ending the project always includes certain actions, like lessons learned where the idea is to collect information about functioning and non-functioning process parts with all the project members
- **Ending the project is not done in a structural way:** As the following steps can be covered by darkness, making the closure can be difficult and if there are things that can be solved internally, those should be dealt earlier and more organized than nowadays

Interviewee no#7:

"We need explicit procedure model how the project should be ended."

- **Tasks that were not done in the project are not actively cleaned or handled:** There might occur situation where the project management software shows that there are several open or actions needed tasks – All these tasks should be cleaned by the project and go through with the

receiving team and with the possible KAM; there can be found several development ideas that can provide additional sales to the end customer

- **Project team members may be left hanging to work with the project delivered solution although they don't belong into maintenance team:** Clearer transition to production team or into another team/project is needed, preparations for the change is needed to more organized in the future

<b>CSA Overall findings</b>	
<b>On Sales -phase</b>	<b>During the project (continues)</b>
– Projects sold on too low resource level	– POCs’ are not used often enough
– Projects started with not enough resources	– Old lessons learned are not systematically utilized and used
+ Working internal project resource search -process	– More project specific information should be shared internally
<b>Starting the project</b>	– No common ways to manage the projects progress
+ Existing specifications – Already created during the sales process	+ Possibility to affect to technical platform and technical choices
– Have to start with unrealistic timetables	– No clear explanation of responsibilities of Team Leader versus KAM vs Project Manager
+ Familiar techniques in use	– Different courses of actions between projects
– No time get organized as a project team – to be The project team	– Collaboration with certain customers can be challenging
+ Created project-models bringing needed structure to project during its live-cycle	– Ongoing unnecessary micromanaging
– Customers are not acquainted to collaboration required by the forthcoming project work	– Missing answers from the management
+ Internal project-team kick-off event is organized and held professionally	– No active promotion of project culture in the case company
– Project kick-off event with external and internal participants are not organized every time	– Missing shared ways of working in projects
– Project-models are in too high-level, more concrete actions needed to guide through project	– No utilization of older and useful features and functions
– No general information available from ongoing projects	– Not enough general feedback during the project
– Have to give too exact project task descriptions to team members (personnel stuck in old way of doing)	+ New “fast-reward”-model is a good tool for managers
– Insufficient follow-ups of the budget details	– More open project information should be shared
– Insufficient follow-ups of the time-information	– No active additional sales / sales process during the project
– Utilization on the competences insufficient	– Missing understanding what is their role required, for example project manager have to work in some cases as a product manager or even as a product owner
– No easily found models of how to run and work in project	- Customers dont know how to work in projects
<b>During the project</b>	<b>Project handover-phase</b>
– Existing technical solutions are not utilized, everything is built from the scratch	– Handover phase needs to be more organized and managed
– Lack of suitable internal tools, like for example testing automation and code review	+ Implementations have gone well
– Project team members have to work other ad hoc -work besides the project tasks	<b>Ending the project</b>
– Project team members may need to maintain existing product during its development project	– Lessons learned session not held every time
– Customer commitment to the project can be weak	– Ending the project is not done in a structural way
+ Positive development for project team members to be able to work only with the project tasks (old responsibilities won’t follow to project anymore)	– Tasks that were not done in the project are not actively cleaned or handled
– Not enough feedback of the performance during the project to team members	– Project team members may be left hanging to work with the project delivered solution although they don’t belong into maintenance team
– No flexibility in the development team member roles	

Table 3. Current state analysis findings.

### 3.3 Key findings Current State Analysis

The top three most up risen topics where customer, communications and process/ organization development in the field of project management process in the target organization.

CSA Key findings	
What	Why
Organization is required to work in projects in agile fashion.	For trying to achieve faster and more efficient productivity company wants to use agile methods, but the personnel is not ready to full utilization of agile methods.
Organization uses model that doesn't allow enough leeway inside personnel roles.	One of the ideas of agile methods is that person could have multiple roles - Case company has created artificially model of working that doesn't support this.
More iterative-approach should be used.	Still building too big blocks, the risk of failure is too big. Should use; MVP, POC's and other suitable methods for eliminating these risks.
Difficulties between new product development and maintenance of existing products.	New features should be developed but also the existing products should run problem free.
Project management process is not clear to everybody.	To achieve the enhanced product development process all processes should work as smooth as possible.
The requirements of the project management are not clear to everybody.	All stakeholders should have knowledge and competences to participate to project to have successful project.
The implementation of the project management practices is uncompleted.	Company has no real opportunity to succeed without full implementation to whole environment.
Project management templates needs to be revised.	To have more efficient and working process, some of the templates should be updated and developed to be more user friendly.
Project management guidance needs to updated.	As there are so many part-time Project Manager it is vital that the guidance documents are up-to-date.
No utilization of the old lessons learned information.	There have been situations where the same challenges have been faced again and again. Without the acknowledge that they might have been solved already in the past.
Starting point is to develop everything from the scratch.	Should be more utilization of already existing solutions and ready-made features available on the markets.

Table 4. Key findings of the current state analysis.

The most comments arise from the theme customer. This topic came up on every interview at least one time during the interview. All interviewees had comments about customers, mainly about those of whom the company has the most longest working history with. There were many different sub-topics; comments about behaviour in projects, knowledge about agile software development, communication skills, collaboration capabilities and incapacity of making decision.

The second most score points received topic was communication. This topic was about information, mostly about the lack of it. All the comments were about how there should be more open communication and more information about the project, its progress and new released features, just a couple to mention here. I see that the interviewees have a good and important point here, all the own products have linkage to each other's. For other development teams it is important to know if there are some changes that might have an effect to their products or for the software helpdesk, it is vital to know when and what features will be released.

Third most score points received topic was actually tie. Development of the processes and the organization received both same amount of points. Organization development was about how the employees should be trained to work according the agile development methods, current bounding roles should be opened and the employees should be trained into more independent thinking and taking more responsibility on daily operations. Process development was a topic that evoked interviewees to give the most amount of different sub-topics than any other topic. Interviewees told that there is a need to use more iterative approach on the development projects, Project Managerial process steps are needed to be illustrated, project document templates are needed and organization could start using POC's as a part of its tools in project business, and many other topics.

As explained in previous chapters the researcher will concentrate only to project management process with possibility to side notes to organization/knowledge development when there is a tight connection into project management process. From the data based on the interviews, the researcher selected weaknesses to address the information from the literature and creates proposal of a list of recommendations what the target organization should make. Weaknesses selected for deeper exploring are shown in the table 5.

<b>Selected weaknesses</b>	
<b>Project Management</b>	<b>Knowledge Management</b>
<ul style="list-style-type: none"> <li>- Management of a project, that uses agile software development methodologies, is unfamiliar in the company</li> <li>- Support and development of the agile development process and real project management implementation missing in the case company</li> <li>- How to lead project using the agile development framework, lack of competences and overall guidance</li> </ul>	<ul style="list-style-type: none"> <li>- Personnel missing the knowledge of the agile development requirements</li> <li>- No actual guidance of how to work in agile-projects, personnel unfamiliar of the requirements of a such project working</li> </ul>

Table 5. Selected weaknesses chosen from the current state analysis.

The selected weaknesses are challenges that requires well thought measurements and active continuous development in the organization. The selected weaknesses are about the general working in projects, and to be more specific, in projects which are using some of the agile framework methodologies, which requires new skills that many of the employees don't have. Issues found about the Project Managerial process are how to be a part of development process that utilizes some of the agile methodologies and what it requires to be leading such a project. Not only the case organization misses the completion of "normal" project way of working, it requires already a developed version of it with concentration to iterative development and its requirements.

Tightly related to the project management process but also to the resources, the interviews pointed out that not only the project management process in overall is having a need to be described and explained, but also its requirements to individual project team members needs to be go over with the personnel. Custom to use waterfall model the major part of the target organization's resources are baffled in the change to projects where the speed and collaboration, overall working fashion is totally different than before on the projects they used to work in. The resources available have years of experience, it would be shame to waste that expertise, as the remedial actions do not require miracles.

## 4 Existing Knowledge

This section discusses about the best practises from the existing literature. Section goes through the details on certain agile development methods, as well as their differences, targeting into project management and knowledge management – How could the models and practises help on improving the current project management process when concentrated into the development of the process, which would be used in Software Development unit. Some customers still prefer waterfall model, although in minority, but still in some team's work is done following this method and one of the downsides is that it is affected negatively to project management process development as some of the personnel is stuck with old roles and model. The CSA highlighted the areas that need improvements, in managing the overall process, when the ambition is a more agile development process. Specific areas for improvement were found out to be project management and knowledge management. Especially so that the project management part concentrates generally into existing knowledge of agile development in software development environment, with suitable methodologies, while also studying applicable knowledge to use while tackling project participants' knowledge challenges in the software projects.

### 4.1 Project Management

In this chapter the researcher will concentrate more into project participant roles and management feature in project management; project briefcase. The basic features will be handled in a short briefing.

As noted by Pelin (2011), project is the work that will be done to achieve specified one-time outcome. This is the way you differentiate the project and its result. In the project work there is always following circumscriptions; scope, quality (technical and overall), timetable and resources in use. Project can have resources from different parts of organization, despite the organizations structure to work for shared goal. (Pelin, 2011, p.31)

The project model is more efficient way of doing when you have to work with participants from several different organization units and when the project goal is to create something over the organizations units or departments. Usually work done as an assignment in one

unit or department have gaps; tasks that nobody doesn't take care and there are information blockages. There isn't anybody controlling the progress and nobody handling issues or actions which needs decision making. (Pelin, 2011, p.32)

#### 4.1.1 Project Organization

The case organization has a variety of different project management process instructions available and a couple years ago with outside help the process steps were gathered into three different models and document templates were updated. What afterwards have become the issue is that there wasn't full scale process implementation after the development work was done. This has lead into situation that the employee's knowledge can be in some units weak. In many cases the following can be already the main point for clearing the process; the role description of a project members in a project.

- Creator of the project
- Steering group
- Project Manager
- Project team member

(Pelin, 2011, p.66-68)

By clarifying the roles and responsibilities many of the existing challenges can be overcome. The above roles are not the only ones, but most frequently involved ones. The person, persons or the team which creates the project makes the decision of starting the project. Its tasks are: starting, aborting (if needed) and ending the project, nominates the steering group and gives the final decision into issues like resources and dispute in organization. (Pelin, 2011, p.66)

Project steering group is a monitoring group that controls the project and makes decisions within the limits that it has received from the Creator of the project. Usually it is the highest organization of the decision making during the project. In a bigger project there might be a need for internal and external steering group. Steering group responsibilities are: defining the scope (time, cost, quality and so on), name the Project Manager, approve the project plan, give needed resources, give needed decision during the project, approve the projects result and end the project. (Pelin, 2011, p.67)

Running the projects daily tasks is the responsibility of a Project Manager. Project Manager also plans the project and supervises that the tasks are done. Project Manager



is also responsible of the following items: preparation of steering group meetings (reports), starts the project team work, sharing tasks to project team, overall monitoring of the progress, ensures the documentation is done, assists the project team in every possible way by ensuring their work and ends the project (including creation of the final report). (Pelin, 2011, p.67)

Being a participant in project requires a lot of team work, collaboration and taking responsibility. The agile methods have even increased the requirements of open and constant development minded working. Project team member responsibilities are: participation to creation of the project plan, carrying out daily tasks (with agreed quality and inside together agreed technical limitations), report to the Project Manager (progress, possible issues and so on), to develop the process and follow the documentation requirements. (Pelin, 2011, p.68)

Many of the CSA findings are related to that the personnel don't know the role requirements. Knowing the role requirements already opens the process knowledge in some parts making the overall process understanding one step ahead towards more complete process understanding.

#### 4.1.2 Project Briefcase

One of the biggest issues on ensuring the long-term success is the management of all ongoing projects towards strategic targets. The target organization has several projects running at the same time without any connection despite that the goal is shared. Project management should be part of a strategic leadership and the tool on helping/solving this could be project briefcase.

Most of the organizations today are running multiple internal and external development and change projects. These projects fight over the same resources and have tight linkages via targets and timetables; still in many organization projects are separate performance without connection to organizations strategy. This leads to situation that there isn't overall picture of what is going and what are the relationships between different projects. (Lehtonen et al., 2006, p.9)

Project briefcase is about managing projects as an entirety. According your needs, the briefcase can consist of one department projects or every projects in the organization.

The basic idea is to lead and manage projects systematically through this overall management tool. The target is to improve business targets as efficiently as possible via three objectives; balancing the briefcase, maximizing the value of the briefcase and ensuring the connection to company strategy. (Lehtonen et al., 2006, p.12)

The balancing is about selecting projects so that they support short and long term targets, but also have enough ingredients which are important to the organization. It is not a good way to select only project that would bring the most profit. The balancing is also important because the resources are limited. Efficient for the organization is balance the projects so that there is both long and shorter projects so that the income is also in balance. Also there are several different options of how to balance your briefcase, for example markets, technology and products. (Lehtonen et al., 2006, p.13-14)

Maximizing the value of the project briefcase means that you are trying to maximize its value by the business objectives. By value it is meaning things that are important to the organization. The most known value is monetary profitability in a chosen time interval. Another values can be for example cost savings, profits and quality related benefits. The strategy linkage is about keeping up the connection between strategic targets and projects. You need to ensure that projects are leading towards the strategic targets of the organization and projects balance the business objectives. (Lehtonen et al., 2006, p.13)

Systematic project briefcase function supports organization in achieving targets and bring transparency into leading change and development activities (Lehtonen et al. 2006, p.15). But securing successful project briefcase function needs that the handling of the individual projects; design, guidance and management is on a good level. Project briefcase function secures that the targets of the projects are correct according to overall targets and achieved by suitable resource usage. (Lehtonen et al., 2006, p.22)

## 4.2 Lean

Lean has had many names during its lifetime. Originally a Japanese concept, known as the Toyota Production System (TPS). Since its different version have been known as for example Total Quality Management (TQM), Just in Time (JIT) and Quality Circles (QC). Every one of these methodology versions includes some aspects of Lean. (Plenert, 2012, p.142)

TPS is Toyota's internal production philosophy, developed already nearly hundred years ago. This philosophy arouse interest in western researchers in the end of 1980's and they invented new definition; Lean. Although this definition is created from Toyota's philosophy, TPS and Lean are two different things. (Modig & Åhlström, 2013, p.77)

Couple nicely describing Lean summaries are:

Lean is a systematic approach that focuses the entire enterprise on continuously improving quality, cost, delivery and safety by seeking to eliminate waste, create flow and increase the velocity of the system's ability to meet customer demand. (Plenert, 2012, p.142)

Lean is a focus on the elimination if anything not required in the delivery of a quality product or service, on time, at lowest cost, to customer. (Plenert, 2012, p.142)

Lean nowadays is actually a collection of different methodologies and tools. Very few of these is required in specific Lean process. When running a specific Lean project one of the key tasks of Lean facilitator is to select and gather up correct set of tools to achieve the wanted result. (Plenert, 2012, p.142)

So what the Lean actually is then, what is it for? Lean is a strategy for actions which emphasises the flow efficiency and not the resource efficiency. Lean is a strategy where the goal is to have organization working in the most efficiently and resource effective way. (Modig & Åhlström, 2013, p.117)

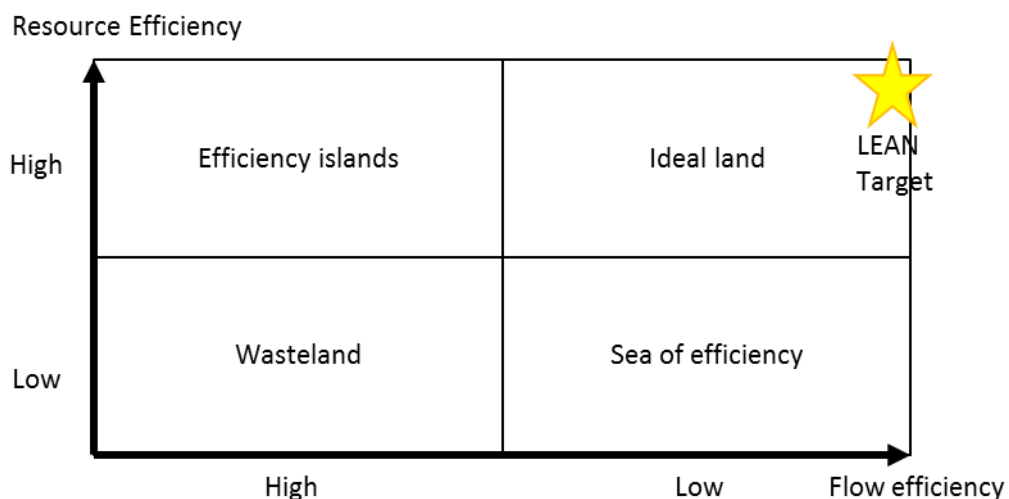


Figure 7. The Efficiency matrix (Modig & Åhlström, 2013, p.100).

#### 4.2.1 Lean Key Principles

Through the origins of Lean, key principles are as follows:

- Defining value from the customer's point of view
- Defining the process; viewing and analysing all the parts of the Supplier-Input-Process-Output-Customer (SIPOC) – This will define the process value stream with the opportunities of waste elimination
- Remove bottlenecks (= obstacles) that are affecting negatively to the value flow
- Drive the service and product flow at the "pull" of the customer
- Build a plan that focuses on the strategic goals of the company and which targets on continuous improvement – Update the plan every year and use it to identify strategic areas of improvement
- Empower participants in the change process through teaming

(Plenert, 2012, p.147-148)

Following the four first key principles organizations have already suitable tool to create more flow and to the change into Lean thinking and Lean organization. (Modig & Åhlström, 2013, p.80)

#### 4.2.2 Learnings from Lean

So as we know, Lean is a strategy to achieve some objective. The objective in the end is to highlight the value-flow by reducing, eliminating and controlling – The aim is to continuously improve flow efficiency and efficient usage of capacity. (Modig & Åhlström, 2013, p.127)

What could the case organization learn from Lean and how it could help? As one of Lean's key lessons is that the resource efficiency is about attaching people to work is bad and flow efficiency is about attaching people to keep work flowing which is good – Paradox in talking about efficiency is that the focus on utilizing resources tends to increase the amount of work there is to do, which leads to inefficiency – It is hard to optimize both, so best is to concentrate to flow (Murray, 2015).

As we have noticed in the CSA results, one example is that there are differences in the management's decisions and the way those projects should have been delivered, within suitable timetable and costs. For an any specific instruction or certain guideline Lean

won't be able to bring for the target organization, but more like an ideology – actually a strategy that the organization should take into use. With the collaboration of the agile development methods, Lean could bind the organization together, when the organization would be trying to achieve best flow, bundling it to organizations strategic targets using Lean's four basic principles: team work, communication, resource utilization and waste elimination, and continuous improvement. Everything that helps to reduce and eliminate the fluctuation in the organization is a good way to use Lean as a strategy. (Modig & Åhlström, 2013, p.79, 141-142)

Organization needs to increase its productivity in the present-day tightened situation and the only way is to utilize its resources more efficiency than in the history. For this the learnings from Lean are providing suitable steps by which the organization could in overall engage and follow the principles. The whole organization needs to change on the hunt of better future. It is not enough that the software development teams use agile and Lean methods if the rest of the organization is unwilling to change. Implementing Lean in the organization would bring all the employees to same level, showing that the continuous improvement is not forgotten and there are means to create more one company attitude by using philosophies like Lean and combining it with agile methodologies. And what are these agile methods and how the target organization would benefit from these; more on next chapters.

### 4.3 Agile Methods

So what is this agile and from its many use, how the agile methods have developed software development in recent years? Agile methods are current approaches when creating new software; basing on customer collaboration, iterative development, team work and response to change. Flexible management and development framework with continuous communication and interactive, trusted teamwork are an epitome for successful agile methods. (Sayani et al., 2009, p.1-2)

Agile methods arise in the 1990s from a specific reason; to success on new software creation which would satisfy the customer needs. Software development had become too complex taking more and more time because of large software engineering standards, large methodologies and large process improvement processes. In the beginning the developers of agile methods tried to use existing standards, methodologies and processes, but these projects failed time and time again. This was the beginning of

what we know as agile methods, these were born because the old models were too complicated and resulted only to failure. (Sayani et al., 2009, p.2)

In the 1990s at least five agile methods raised to help projects to be successful: Crystal Methods, Feature Driven Development, Extreme Programming, Scrum and Dynamic Systems Development. The creators started from empty table, not utilizing the old methods and invented what was necessary to succeed. Scrum, one of the first agile methods, adapted ideas from new product development approaches from the 1980s, like teamwork and iterative development. (Sayani et al., 2009, p.3)

In the late 1990s four events triggered explosion of agile methods: 1) the emergence of Crystal Methods, Dynamic Systems Development, and Feature Driven Development; 2) the creation of Extreme Programming; 3) the creation of Scrum; 4) the Agile manifesto. (Sayani et al., 2009, p.4). The Agile manifesto was signed in 2001. It is a result of consortium of agile software development methods representatives whom wanted to have alternative to heavyweight software development process. The Agile Manifesto is a statement of agile development, about the values of it – the principles to follow on agile software development. (Highsmith 2001)

To summarize agile methods; fundamentally new approaches which were created in 1990s to save failing software project in software developing. Based on teamwork, iterative development, customer collaboration and adaptability to change. The agile methods give new software development just-in-time, right-sized, just-enough processes and documentation. Attributes like programming ability, experience, skill and talent are also highly valued in agile methods (Sayani et al., 2009, p.5). Agile methods are occasionally called as lightweight methods, especially because they are less prescriptive than traditional methods. (Kniberg & Skarin, 2010, p.9)

#### 4.3.1 Agile Software Product Development: Scrum

One of the first agile methods developed in the 1990s was Scrum. With a strange mix of teamwork, iterative development and customer interaction, Scrum projects started to succeed. Since those days Scrum has become one of the most used methodology. (Sayani et al., 2009, p.3-4)

Scrum isn't a methodology, it is a framework (Kniberg, 2007, p.7). A framework for sustaining and developing complex products. Within this framework you can address complex adaptive issues, while creatively and productively delivering products of the highest thinkable value. Theory of the Scrum is that it is founded on an empirical process control theory, employing an iterative, incremental approach to control risk and to optimize predictability. In Scrum, three pillars hold every implementation of empirical process control: 1) transparency, 2) inspection, and 3) adaptation. These pillars describe some of the principles that Scrum has, for example regarding to transparency: definition of "Done" must have similar meaning to everybody. When the values of Scrum (openness, respect, focus, courage and commitment) are combined to pillars and lived by the Scrum team, everything comes to life and builds trust for everyone. (Schwaber and Sutherland, 2016, p.3-4)

The framework of Scrum consists of certain rules and Scrum teams with their associated roles, artifacts, events and rules. The rules tie together the roles, events and artifacts, governing the interaction and the relationship between them. Each component within the framework helps on a specific purpose and is vital to Scrum's usage and success. (Schwaber and Sutherland, 2016, p.3)

There are several key ingredients of software development using Scrum. Organization needs to be divided into small, cross-functional, self-organizing teams. The work that will be done, must be split into a list of small, concrete deliverables; list must be sorted by priority and estimate the relative effort on each of them. Time will then be allocated into short, fixed length iterations (normally one – four weeks), with potentially ready code demonstrated after each iteration. The release plan needs to be optimized and priorities updated in collaboration with the customer, based on the insights gained by inspecting the release after every iteration and the process should be optimized after each iteration by having a retrospective. So instead of a large group of employees spending a long time period building one big thing, have a small team using short time building a small thing – but integrating regularly to see the total picture. (Kniberg & Skarin, 2010, p.3-4)

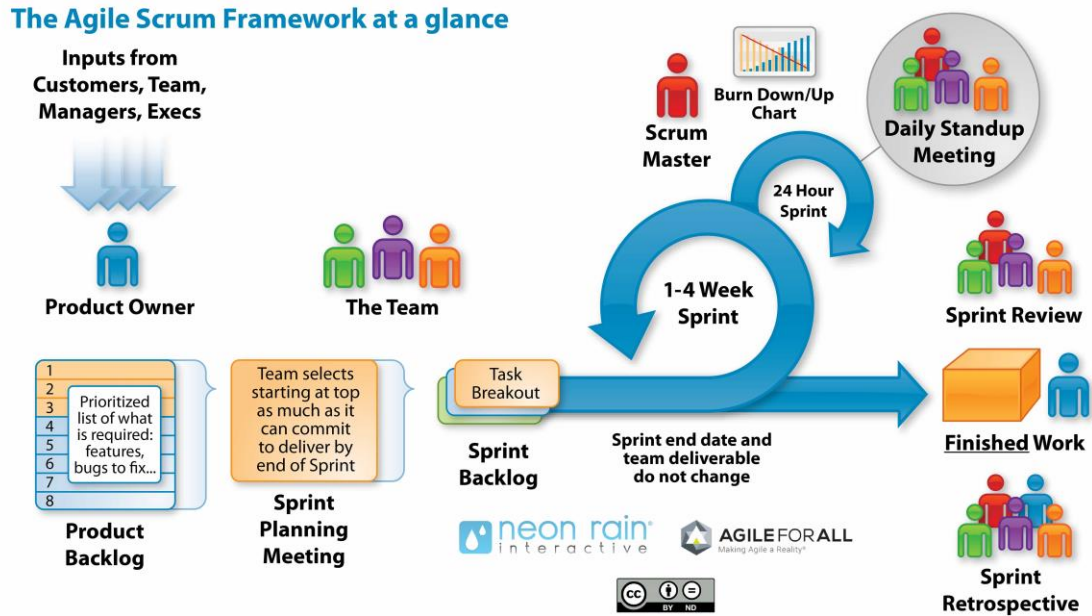


Figure 8. Scrum diagram (Neon Rain Interactive, 2017).

The Scrum team consists of a Scrum Master, the development team and a Product owner. These teams are self-organizing and cross-functional, they select the best way to accomplish their work and have all competencies needed to accomplish the work. The model for teams in Scrum is designed to optimize flexibility, productivity and creativity. (Schwaber and Sutherland, 2016, p.5)

The work will be done in Sprints, that normally are one to four weeks long. All work is done in tight co-operation inside the development team but also with daily collaboration with the customer. Members of the project have certain roles, which have certain responsibilities and characteristics. During the Sprint prescribed events are in use to regularity and eliminating unnecessary meetings – all meetings are time-boxed events, every event has a maximum duration. The Sprint is the heart of the Scrum, time-boxed period when usable and potentially releasable product increment is done. The Sprint consist and contains all the development work, Daily Scrums, the Sprint planning, the Sprint retrospective and the Sprint review. (Schwaber and Sutherland, 2016, p.7-8)

Scrum artifacts are designed to maximize the transparency of the key information so that everybody has the same understanding of the artifact; product backlog and sprint backlog are two lists that contain all the needed information. Product backlog is an ordered list of what could be needed in the product (all features, functions, requirements and so on), the items in the list have attributes of a description, value, order and estimate



for the development team to work with during development phase. (Schwaber and Sutherland, 2016, p.13-14)

Scrum was selected to be part of this research as the target organization have had some software development projects where Scrum has been in use.

#### 4.3.2 Agile Software Product Development: Kanban

Kanban, translation from the Japanese word is “signboard”. It has roots in the early days of Toyota Production system (TPS), where Taiichi Onho developed Kanban to control production between processes and Just in Time (JIT) manufacturing in Toyota manufacturing plants in Japan. Originally Toyota used Kanban to manage machine utilization and to reduce costs, by using Kanban’s Toyota minimized the Work in Process (WIP) between processes and reduced costs associated to holding inventory. (Gross & McInnis, 2003, p.1-2)

In manufacturing, with Kanban, the operators use visual signals to determine how much they run and when the stop or change. Gross and McInnis define Kanban as a scheduling tool, scheduling demand in processes controlled by Kanban’s (Gross & McInnis, 2003, p.2). As the years went by the basic idea of Kanban transferred to other sectors like Software development. And as like Scrum, Kanban is utilizing principles from Lean and agile.

The basic principles of Kanban are to visualize the workflow, limit the Work in Progress (WIP) and enhance flow. (Kniberg & Skarin, p.4-5). By visualising the workflow can be very informative impact and limiting the WIP helps to balance the flow based approach so that the teams don’t start and commit to too much tasks at once. Enhancing the flow means that when something is finished, it is clearly seen and the next highest task from the backlog is pulled into work (VersionOne, 2017).

Like Scrum, Kanban endorses continuous collaboration and encourages ongoing, active learning and improving the best possible team workflow. The entire focus on the team is getting the tasks done that are in progress. Kanban and Scrum at their core could be summarized: “*Stop starting, start finishing*” (VersionOne, 2017).

Kanban is a technique for managing the software development process in a highly efficient way. Kanban is a simple but powerful, in its simplest model a Kanban system consist only from a big board on the wall with cards placed in columns with numbers at the top. Cards represent the work items as they flow through the development process, columns representing the process phase. The numbers on the top of every column are limits on the number of cards allowed in each phase – The limits are the critical difference between Kanban and other visual storyboard. Limiting the Work in Progress (WIP) in every process step Kanban prevents overproduction and reveals bottlenecks immediately so that the team can address them before it is too late (Peterson, 2015).

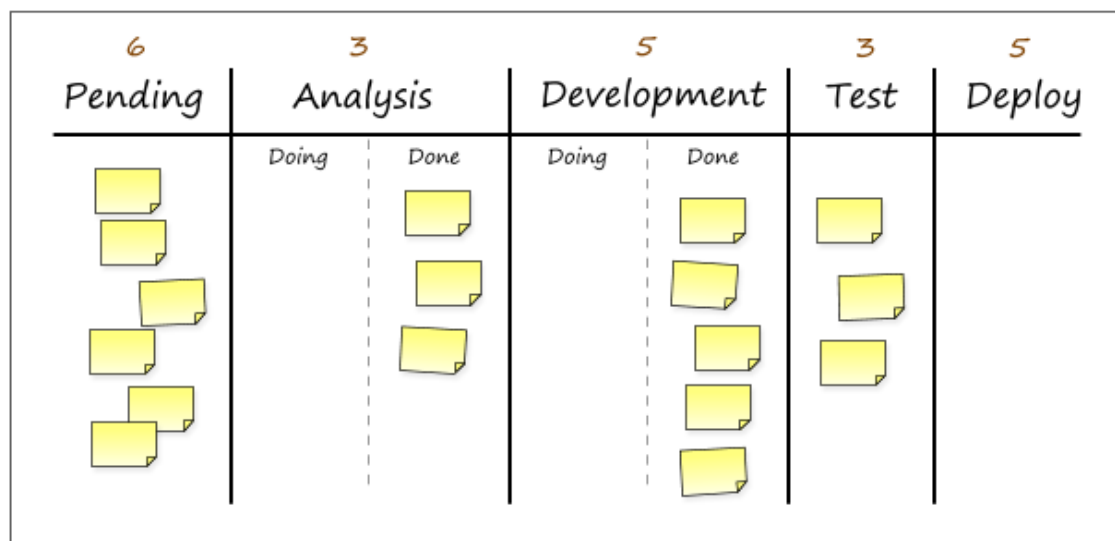


Figure 9. Kanban-board (Peterson, 2015).

The benefits of using Kanban are similar than in with Scrum. When priorities change very often Kanban is ideal, it is very responsive to the change. Shorter cycle times means faster feature delivery with fewer organization than many others. Kanban balances demand against throughput which guarantees that most of the features are always being worked. Kanban reduces waste and can remove activities that don't add value to the organization. Kanban's rapid feedback loops increase the possibilities of more motivated, empowered and high-performing team members (VersionOne, 2017).

Kanban was selected to be part of this research as the target organization have had some software development projects where in some parts Kanban have been in trial use.

### 4.3.3 Agile Summary

Scrum and Kanban are both process tools, tools as means to accomplish a task with a certain efficiency by giving on a certain extent, instructions of what to do (Kniberg & Skarin, 2010, p.7).

<b>Differences between Kanban and Scrum</b>	
<b>Kanban</b>	<b>Scrum</b>
Timeboxed iterations optional. Can have separate cadences for planning, release, and process improvement. Can be event-driven instead of timeboxed	Timeboxed iterations prescribed
Commitment optional	Team commits to a specific amount of work for this iteration
Uses Lead time as default metric for planning and process improvement	Uses velocity as default metric for planning and process improvement
Cross-functional teams optional. Specialist teams allowed.	Cross-functional teams prescribed
No particular item size is prescribed	Items must be broken down so they can be completed within one sprint
No particular type of diagram is prescribed.	Burndown chart prescribed
WIP limited directly (per workflow state)	WIP limited indirectly (per sprint)
Estimation optional	Estimation prescribed
Can add new items whenever capacity is available	Cannot add items to ongoing iteration
A Kanban board may be shared by multiple team or individuals	A sprint backlog is owned by one specific team
Doesn't prescribe any roles	Prescribes three roles (PO/SM/Team)
A Kanban board is persistent	A Scrum board is reset between each sprint
Prioritization is optional	Prescribes a prioritized product backlog

Table 6. Scrum and Kanban differences (Kniberg & Skarin, 2010, p.50).

<b>Similarities of Kanban and Scrum</b>
<b>Kanban &amp; Scrum</b>
Both are Lean and Agile
Both use pull scheduling
Both limit WIP
Both use transparency to drive process improvement
Both focus on delivering releasable software early and often
Both are based in self-organizing teams
Both require breaking the work into pieces
In both, the release plan is continuously optimized based on empirical data (velocity/lead time)

Table 7. Scrum and Kanban similarities (Kniberg & Skarin, 2010, p.49).

Even though the methodologies have similarities, they have many differences and in a quite fresh agile environment like in this case, it would be better to stay on one methodology and learn its own specialities. In this case already the usage of prescribed roles would create needed structure and support the process by giving it the needed carriage.

#### 4.4 Conceptual Framework

The previous chapters (4.2. and 4.3.) described the two biggest influencers to the two presented methodologies or framework that really made a big difference onto the way how the development of software was made. In this chapter the researcher will present the summary onto what the proposal on next pages will be based on. Methods are distinctive, you should understand the basic principles on all of them in order to find the best solution for the target organization needs.

From the existing knowledge can be found several sources and sectors where there can be found information how to solve the challenges in overall project management process but also when going into a bit deeper into case organization and to work relating to software development – This is the most important work that needs to operate as well as possible, all the glitches in these teams will have a great influence to the financial result of the company.

After the analysis the researcher could pin-point several process steps where the lack of the full implementation of project management process is clearly seen. Many of the challenges could be solved using methodology like Scrum during the project. And not only using it half, like nowadays. By following the rules and steps of Scrum many issues on project management could be dealt. For example, the usage of product backlog management and sprint planning as couple of operation model examples to mention here.

Organizational development must be a continuous process where the project management process should be seen as one of the most important topics. To deepen the project process know-how, agile and Lean should be more presented in the organization and ways like MVP (minimum viable product) should be really a topic on how to develop the operations by using agile methodologies.

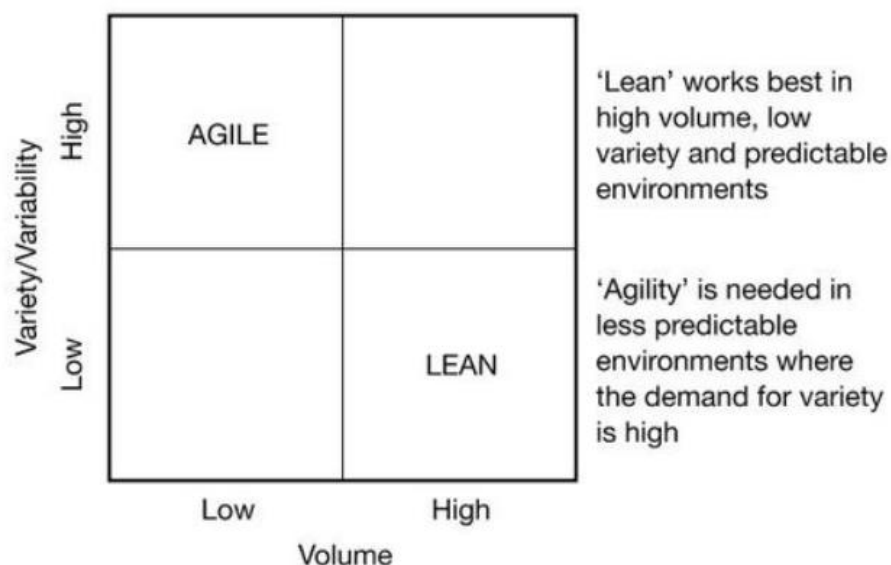


Figure 10. The best usage of Lean and agile in different environments (Martin, 2005, p.118).

As from the proposal we can see that there are also several other principles or guidelines that are picked up from the interviews, all tightly relating to enhancing the project process but not that connected to agile way of working like the utilizing existing source codes, not to build everything from the scratch every time. The proposal won't concentrate strictly only to findings from the existing knowledge, but also utilizing the CSA results and the years of experience of the researcher.

With the current information gathered from the existing knowledge it is easy to say that the implementation of project management process is uncompleted. Despite what are we talking about strategy like Lean or agile methodologies they require commitment from the whole organization and full scale implementation to all organization units. The existing knowledge revealed that the implementation of Scrum is badly unfinished, the missing pieces are now revealed from the existing knowledge and can be more easily understood that in some cases the prerequisites of the software development team where in such a shape that possibility to success have been minor. There are several other examples what the existing knowledge lifted up, like for example during the project work you cannot change between methodologies, the differences are significant. Also many piece of information showed that the continuous development of the organization is required on going into more deep awareness-level on agile methods, in generally this should be based on the development team's collaboration and wanting to develop its

functions; but there are already some good examples of determined work and its results, although this will require also some organizational changes in the future.

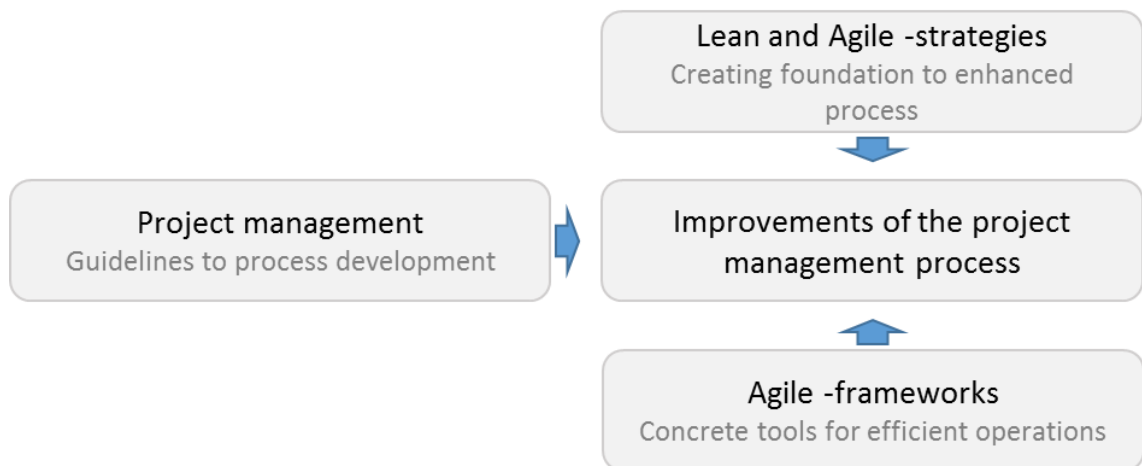


Figure 11. The Conceptual framework of the improved project management process.

On the next section the proposal will concentrate how the above three different sectors created the foundation and provided detailed information for the creation of the improved process parts.

## 5 Proposal

Proposal is concentrating how the project work on Software Development unit could be more functional and efficient; but also to be suitable to other process related functions in the organization for helping on a wider “*Projects – the way to work*” implementation and on supporting the ongoing organizational development. Proposal is done by processing the data collected on CSA phase and using the findings during the literature review – resulting to a list of recommended actions for the target organization.

### 5.1 Initial Proposal

As we know from the previous chapters the researcher was asked to concentrate to process development of the project management with also taken into account the suitable, tightly related knowledge management development challenges. The CSA revealed that the organization is required to work in projects in agile fashion, but the knowledge of a working in a such way is unfamiliar to the case organization, also the

management is running forward with a more iterative approach which should be used on development phase, although even the “normal” project management process is not clear to everybody. The requirements of project management are not clear to everybody and this is partly because of the implementation of project management practices is uncompleted. Few years ago there was a large scale project management development project with external partner to improve the process, but as already mentioned before, without real implementation to whole organization. There has also been gaps in the development that are showing so that the project management guidance needs to be updated and the project management templates needs to be revised. Difficulties between the new product development and the maintenance of existing products are having negative effects into personnel and onto development progress. And usually, not that time friendly option when developing software has a starting point so that the ambition is to develop everything from the scratch.

But it is not only the process enhancement that will be enough, organization needs to understand the continuous development, it should utilize old lessons learned information and develop its personnel roles from limiting model to more open model with more flexibility on available.

<b>CSA Key findings</b>
Organization is required to work in projects in agile fashion.
Organization uses model that doesn't allow enough leeway inside personnel roles.
More iterative-approach should be used.
Project management process is not clear to everybody.
The requirements of project management are not clear to everybody.
The implementation of project management practices is uncompleted.
Project management templates needs to be revised.
Project management guidance needs to updated.
No utilization of old lessons learned -information.
Starting point is to develop everything from the scratch.
Difficulties between new product development and maintenance of existing products.

Table 8. The current state analysis key findings.

The selected weaknesses from the CSA in top level format from project management are: managing agile methodology software development projects is unfamiliar and lacking knowhow/overall guidance, missing implementation of project management operations with un-existing support and continuous development of process.

The selected challenges from the CSA in top level format from knowledge management are: missing organizations personnel development to agile development methods and the way it requires certain changes on guidance and personnel development to be done.

<b>Selected weaknesses</b>	
<b>Project Management</b>	<b>Knowledge Management</b>
<ul style="list-style-type: none"> <li>- Management of a project, that uses agile software development methodologies, is unfamiliar in the company</li> <li>- Support and development of the agile development process and real project management implementation missing in the case company</li> <li>- How to lead project using the agile development framework, lack of competences and overall guidance</li> </ul>	<ul style="list-style-type: none"> <li>- Personnel missing the knowledge of the agile development requirements</li> <li>- No actual guidance of how to work in agile-projects, personnel unfamiliar of the requirements of a such project working</li> </ul>

Table 9. Selected weaknesses chosen from the current state analysis recap.

Going into deeper on the challenges in the process researcher found that several process steps needed some actions. Many of the issues were because of the lack of knowledge about how to utilize and use agile methods and what it really requires from the organization, but also some missing collaboration between different units and many others, like in the summary below:

- Incomplete tasks within a sprint
- Product Owners (PO) change priority within Sprint
- According to Scrum framework there should be only one PO
- Product Manager (PM) is not prioritizing the tasks
- Backlog list is not updated
- Work needed to do for the production environment
- Issues with schedules
- Development teams are not fulfilling the requirements/set targets
- Quality Assurance (QA) is heavily loaded in the end of the sprint
- Missing specifications
- New tasks during the sprint
- Not familiar what is the role requirements
- Missing collaboration with Helpdesk
- Definition of Done



- Missing technological solutions
- Tasks going directly to developers
- Incomplete usage of the tools
- Project Manager is missing important information regarding the project

The proposal will be focusing on minimizing the challenges in the project delivery, mostly concentrating into the findings in the software development process to tackle the original business problem: untapped assets in Project delivery; organization has big amount of capable personnel that aren't used in optimal way and inefficient project management processes that needs to be updated. The parts of the proposal will be in random order in next:

**Iterative approach in to use in the entire organization:** The waterfall model isn't efficient or realistic way to develop software in current market situation. If the customer doesn't realize that, the target organization should explain why and what is better option and how to utilize it. Despite the team or unit, all should have the same strategic targets and similar, best tools in use. The ideological change should be the change into more iterative and agile way of doing. The benefits of for example wider exploitation of Minimum Viable Product (MVP) would bring the organization towards more agile and iterative way of working organization to fight in the market where constantly new competition arise and you are needed to provide visible results fast and constantly.

## MINIMUM VIABLE PRODUCT (MVP)

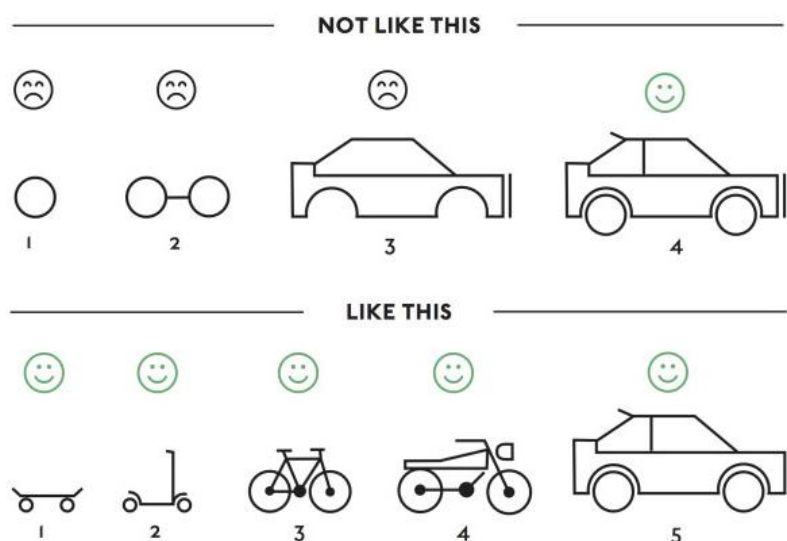


Figure 12. Minimum Viable Product (Faber, 2015).

One well written down, about the key idea or the essence of MVP was:

“Building a *Minimum Viable Product* is about negotiating project scope to optimize product budget, timeline and quality.” (Faber, 2015)

And Faber continues:

“We want to over deliver – not overpromise.” (Faber, 2015)

Both of the sentences could be as guidelines to the case organization by providing them what to go after and what the MVP actually means.

**Agile software development:** This is about the change and decision that the target organization needs to take. This entirety is about managerial understanding and decision of the full utilization of agile development practices in the whole organization. This represents a change in the thinking and practices, which should lead to organizational change. Despite what agile methodology is favourable at the current moment the ideological change requires a true implementation in the case organization and to its closest customers as there is organizations that require quite a lot of assistance on the change.

**Agile software development methods:** There are several options available; Scrum, Kanban, Scrumban and so on. The case organization should provide brief introduction packet about different methodologies and the information about the options and the differences should be well known by the Project Managers. Now there can be one self-educated person in the project who is saying how the process should go, but nearly always the knowledge is very shallow resulting to continuous roadblocks to the team and in addition, many important feature is not used as designed or at all.

**Mini project model:** Many of the interviewees are working temporarily as a Project Manager. They indicated in the interviews that as you don't constantly lead projects you have difficulties to remember and know what is expect to do and especially they were on a need of a smaller size project model that wouldn't be so heavy than the smallest of the current models. The target organization should create XS model by following the same model as is already used in current project alternatives, but simplify the current S model by reducing the amount of actions required.

**Proof of Concept (POC):** POC phase could be called as a miniature phase of a software project. The purpose is to create certain limited part from a wider solution, the aim is to

find out could the software be suitable and usable on a needed purpose. After the POC phase the customer would have more information about the possible solution and could make decisions with the data from real working software, although with limited features available, but still much more than without – Many customer is having challenging time with the current economic situation and this approach would bring more opportunities to the target organization. New projects or developing the existing customer solutions by showing the possible future, adding value via the POC and future co-operation.

**Habit of giving feedback:** Despite the methodology in use, it has been quite clear that different persons working in different roles would like to have more feedback during the project. One easy way to start this, possibly even quite difficult topic in Finnish organizations, would be to follow what some agile methodologies have developed to be used, for example, retrospective events and other used in elsewhere, like lessons learned events after the product finalization or even after certain big milestones. Organized and frequent use of these two events would be a good starting point for continuous organizational development, providing important information about the process and the people around it.

**Process descriptions:** Many case organization members complained that they are missing the bigger picture of how the project as a process should go; how to start a project, how to end the project, wanting more concrete information of how things should be done. Project Office should provide descriptions of the key process steps to the organization and additional information that is related to each step, via real-life examples. Also what seems to be very unclear is to where to have the support to Project Managerial related issues. That shouldn't be the case anymore after the revised guidelines and instructions, including the Project Office presence update.

**Project document templates:** Slightly relating to the above mentioned additional information about the project management process but more to the fact that project documents are not that supportive towards agile development, they have started to contain unnecessary information and the visual look could be more modern. Templates which are used and needed in the projects should be updated. For example, steering group reports could have more modern look to present the project status via suitable dashboard page. Every projects have certain key values to follow and there is possibility that the current presentation is providing information that might give wrong impression about the actual status. As with the process descriptions, the document templates should

be continuously developed and maintained; the Project Office should take the responsibility of this task and revisit the document templates on a regular basis.

**Ending the project:** Several employees indicated on interviews that the ending of a project is a mishmash of tasks and roles, where there aren't common instructions what to do and in a case of changing from project mode into maintenance mode; how to run the transition phase has been unorganized group doing similar tasks without co-operation. Despite which of the case would be, the organization clearly needs some guidelines and role descriptions of how to end the project in organized way. Again something that the Project Office should take care of in the near future.

**Model for co-operation:** When going over the unit borders in the case organization the more different the way of working can be. This has resulted into a situation where there are challenges in co-operation, for example in some cases the product development doesn't have the information from the software helpdesk; if there are some reoccurring errors in the software they are developing or maintaining, or what is the most wanted new development feature that the end-customers are requesting. The case organization requires to have internal rules of collaboration and should remove special rights from certain teams, there shouldn't be any exceptions, all should have similar rules and understand the changes in the environment. The way it has been done years, is not in many cases, the best alternative to do nowadays.

**Yearly planning:** In several occasions and comments many complained that there seems to be no planning of activities or information about agreed deadlines affecting to the project. In several cases there were comments that something is promised to do to some stakeholder, but this information isn't known by the Project Manager or the development team. This has led to situations that the development team has had to change completely the content of their work, which in short notice usually creates several issues, missing UI designs, missing specifications and technical solutions, just a few to mention. The case organization should utilize yearly planning which would be constantly updated and visible to everybody – If it is project specific, this could be on agenda on the project team meetings (or in every Sprint review if Scrum in use) regularly. Software unit should prepare this kind of plan about every products and every slightly bigger project should have one, if many stakeholder is in relationship to the project. This tool would work as a tool for perceiving the operational environment and as a tool for time management.

## ANNUAL MANAGEMENT SCHEDULE



Figure 13. Example of annual management schedule (TVO, 2013).

**Starting the project:** There is always hurry to get the project tasks in going although the project has just started. The company is not reserving any extra days to get the project team organized and required tools to be ready. Even when there has been some kind of specification available, it usually seems to be just a big mess. The project team members don't know others, there isn't knowledge about the project requirements process wise, technical environment is not in that kind of shape that you could be building the solution and so on. Feedback from the CSA was that more time is needed for the start. Building the project requires certain elements, selections to be made and several documented specifications when there are several developers ready. And based on the information collected for this research, the lack of time usually multiplies issues that the project team needs to take care during the project, if these are not solved already on the starting phase. Project Office should change the starting point so that the starting project team

would have more time to get organized. If needed Project Office could use couple of coming projects as a pilot for renewed process.

**Utilization of existing source code:** Many times the development work is started from the scratch and same features are developed again and again, for example printing capabilities. Many of the software produced by the company is having possibility to print but still the new projects are not utilizing even the latest version of suitable developed feature. The target organization has created several different software that could be used as templates for other solutions, utilizing the best options in new projects. The R&D unit should provide list of features that could be beneficial in the future.

**Utilization of Scrum:** Numerous challenges during the project could be eliminated by using agile methodologies as they were supposed, not only parts from there and there. It is nice that the project team can have influence how the project should go, but as the experience has showed, removing certain events creates a vacuum where certain tasks are not dealt and the project will have performance issues in some phase, sooner or later. agile methodologies like Scrum seems to be working well in the case organization software projects, but they should follow all the guidelines of it. One key idea of Scrum is continuous process improvement which the projects have not utilized; missing sprint retrospectives will remove one of the elements that is designed to help team members during the project – implementation of Sprint Retrospectives, would start a formal way to collect feedback from the development teams to gather information for example to be used as enhancing the product development process. Using simple questions like:

- What was good or positive in the last sprint?
- What was bad or negative in the last sprint?
- What could be improved in the next sprint?

Also the roles should be taken into use as they are supposed to; Product Owner (PO) is a very important role and unfortunately the case organization haven't been able to implement this role to the existing Product Managers or employees who are responsible of the products. Without up-to-date product backlog it is impossible to create sprints. As the work needs to continue, this has led to situations where the Project Manager have had to act as a PO without the knowledge of the real product roadmap. Project Office team members should all know the principles behind the Scrum, there is huge amount of existing knowledge available, like The Scrum Guide by Schwaber and Sutherland. Project Office team members should implement this framework on their projects and

spread the model through organization, Scrum would bring needed roles, events and structure to projects quickly, eliminating many CSA findings.

**Project Briefcase:** In the target organization nearly everything is done via project work, even the oldest customer organizations are changing into project model in their development work. Although there are challenges in some of the project management process steps, they seem to be quite easily managed, but running several individual projects Project Managers tend to run into situations that the project is related to another project and there are decisions to be made, concerning both projects. This has raised several comments that there is a need for overall management that would tie all the projects together. Project Managers are struggling sometimes with the decision making which is not always on that level in which it would need to be. For supporting the visibility of all the projects and the decision making, the case organization would need to have project briefcase which would collect all the projects into one. The long-term success requires management of all ongoing projects towards strategic targets and the organization needs to know the linkages between projects. Projects fight over the same resources and have similar time schedules, the target organization needs to know the overall picture and what are the relationships between different projects. Project Office would need to start development project to solve this issue – despite on which sector you are, there are several examples from existing knowledge, like book “*Project briefcase management – Strategic leadership of development activities*” by Lehtonen et al., the same challenge has been around for decades and there is a huge amount of information available for utilization.

**Roles in the organization:** The case organization is stuck with the old fashioned roles that were developed to support the waterfall process model. The current way of development requires different approach. The case organization needs personnel that is capable of performing multiple roles during the project, which is not only a problem developed by the company, but also a problem in the personnel. The agile development is fast moving, requiring a lot of collaboration, doing things together constantly and over specified old fashioned roles like designer and QA team member. The salary should be based on the performance, quality and the capabilities of the person, not what is the title; which seems to be one issue – there is not enough flexibility in the salaries, they are too tightly connected to the role that is then artificially limiting what the person does, but also creating limits what the persons want to do. The case organization development, of its personnel, should start by introducing the new requirements of the business environment

and agile development to itself and then HR department would need to remodel its roles and create suitable structure that would support the way the work is now done nowadays. The development work would be good to make together with the real project management implementation, starting from describing what is the actual project organization and how it works. There is many layers and angles of what is needed to achieve the real project organization. In this side it is also showing, that the missing project way of working implementation has piled up some challenges that are needed to carry out.

**Back office:** Based on the personnel feedback, there is a constant uncertainty of who is responsible of what back office tool and which information. Whom to contact on time management tool additions, project management tool issues, who admins SharePoint sites, who invoices and so on. The HR department could create with the suitable teams a collection to be put into Intranet of whom to contact on these cases.

**DevOps:** Continuous delivery, issue in some projects, as the same team needs to develop new features, but also maintain the existing ones. During the project phase this has created some last minute changes to the developers' activities and unfortunately the best way to be prepared to situations like that is to reserve some amount of time from the sprint to these tasks. But for the life after the project the case organization clearly needs new tools for co-operation in the whole organization. It has some lacks in the operation where there is needed also resources from other units, like network engineers and DBA's. This is where the organization might found DevOps to be able to improve the collaboration. Citation by Mueller:

“DevOps is the practice of operations and development engineers participating together in the entire service lifecycle, from design through the development process to production support.” (Mueller, 2010)

As agile, DevOps is also hard to explain shortly, it is an ensemble of practises giving a set of tools for creating enhanced operation between the software developer and other IT employees, targeting into continuous software releases.

“What DevOps hopes to bring to Agile is the understanding and practice that software isn't done until it's successfully delivered to a user and meets their expectations around availability, performance, and pace of change.” (Mueller, 2010)

R&D department of the target organization should investigate if there would be enough benefit to utilize DevOps in the organization as it clearly needs some kind of development for enabling its continuous delivery more efficient.



Proposal	
What	Why
Iterative approach in to use in entire organization	The ideological change should be the change into more iterative and agile way of doing – To be able to respond market challenges and serve customers more efficiently and responding to changes quickly by utilizing tools like MVP.
Agile software development	To stay on the same level as many of the competitors, the software development unit needs to be modern, up-to-date and utilize the latest tools and best practises.
Agile software development methods	Utilizing one methodology like Scrum would be beneficial to whole organization. This would provide support and provide already existing solutions to the challenges that the case company is having.
Mini project model	One concrete solution that would help all the members of the organization to run smaller projects; giving instructions and guidelines what to do even they weren't professional project managers.
Proof of Concept (POC)	Changing the approach to more iterative fashion would provide faster and concrete examples of the possible software to the customer, without a big financial contribution to unknown.
Habit of giving feedback	As a part of continuous organizational development and the development of the project management process it is crucial to create an environment where the different information is collected directly and constantly.
Process descriptions	To remove the gaps on the members of the case organization; lack of awareness of how the project process should go.
Project document templates	The case organization needs updated project document templates to have a harmonious look, same content and to provide support for the process as the project on goes.
Ending the project	Removing the confusion on the last phases of the project needs a structural approach and a guidance how to perform it correctly.
Model for co-operation	To integrate the different working models in different units for more coherent and efficient organization. Removing existing exceptions by harmonizing rules and developing model to be used in the collaboration between the units.

Table 10. The target organization proposal part I of II.

Proposal	
What	Why
Yearly planning	Development team members are having issues to know if there are some special requirements or deadlines in the timetable. There is no visibility or transparency between units on the product roadmaps, which should be requirement to Product Marketing.
Starting the project	A few extra days in the start are more beneficial than issues and missing phase during the project. Starting the project requires so many actions to be done, during which there isn't really any real progress reasonable to be expected.
Utilization of the existing source code	Similar features expected to develop all the time, still no utilization of old own existing solutions or readymade alternatives. Removing the ideology of doing everything self and from the scratch.
Utilization of Scrum	Full utilization of Scrum would remove several CSA raised challenges and it would bring a lot of required structure and a process model to whole organization, not only to development team members but also to other stakeholders.
Project Briefcase	Entirety of all projects, ensuring that company's long-term strategy is followed and all the projects work towards the shared goal with the right resources and no decision are missing.
Roles in the organization	Flexibility needed in the roles that the organization is using. More flexibility in salaries as well in the role descriptions to open up the old fashioned way of thinking.
Back office	Clarify who is responsible of what and how the needed operations are best to organize.
DevOps	Continuous delivery and co-operation between units could benefit about DevOps in their collaboration by providing tools for the continuous software releases.

Table 11. The target organization proposal part II of II.

## 6 Proposal validation

This section discusses the validation of the selected development topics. It brings up the comments and feedback from the proposal validation meeting and builds up the final proposal for the target organization.

### 6.1 Validation Overview

The proposal for the target organization was built upon several sources, current state analysis providing knowledge and feedback from the case organization itself and the Conceptual Framework, built upon the best practises found from the existing literature. These two provided the base for the proposal of the development work. The built proposal was then presented and handled in a meeting (Data 3 meeting).

Data 3 session was a meeting where all the company's all-time Project Managers discussed and processed the initial proposal. Data 3 session was a meeting, face-to-face discussion, where the earlier meeting (Data 2) remarks where showed as a recap, but mostly concentrated to the recommended actions for the Project Management process development (initial proposal). Meeting participants gave their comments about the topics on the proposal and during the discussions some minor additions were made to the proposal. Participants were very unanimous about the changes and to the order how the development work should be set.

### 6.2 Final Proposal

During the Data 3 discussion, on the proposal validation meeting, study received valuable feedback from the participants. Their experience about the latest projects is such as that there are a couple clear action points that are in a need of a corrective actions, in the first in the line. Also another clear observation was that the participant's thought that the listing is very good, but also everybody thought that it is very long; for the development work there is a need to set a starting point from where to start.

Project Manager no#1:

"We need to start somewhere, ending the project would be my favourite starting point."

Project Manager no#3:

"A lot of good ideas and development targets, but somewhere is needed to start."

Project Manager no#4:  
 "We need to concentrate in to something first."

In co-operation with the participants of the proposal validation meeting the researcher decided to create some kind of prioritization of development activities to remove the possible obstacle of, that nothing would be done, because the organization don't know where to start. With the participants a top three most urgent actions requiring topics were chosen.

Based on the participant's latest experience and feedback from the organization, including part-time Project Managers, the processing of the proposals action points was seen so that there could be different level of actions. Fast solving concrete actions, a bit more work needed for to handle the process steps and finally, implementing a totally new function to the organization. The selected top three topics are (following above mentioned structure): Updating the Project document templates, revise the Ending of the Project process and implementing Project Briefcase function in to the organization.

Proposal	
What	Why
<i>Project document templates</i>	The case organization needs updated project document templates to have a harmonious look, same content and to provide support for the process as the project on goes.
<i>Ending the project</i>	Removing the confusion on the last phases of the project needs a structural approach and a guidance how to perform it correctly.
<i>Project Briefcase</i>	Entirety of all projects, ensuring that company's long-term strategy is followed and all the projects work towards the shared goal with the right resources and no decision are missing.

Table 12. Selected top three development actions.

Updating the project templates is about giving updated highly usable project document templates to the organization. These would provide support in all the needed phases and would give united look to outsiders. The second point was further development of the projects ending phase; there is too much confusion, the organization requires some

guidelines and role descriptions of how to end the project in organized way. The last, third action point was to start completely new management function into the company, which would operate and manage all the ongoing projects in the company. More information about the development actions in specific can be found from chapter 5.1.

If we compare the selected issues, the first three action points or others in the proposal, to the weaknesses which were found on CSA – there isn't a topic in the proposal which wouldn't be somehow connected to the overall topic. The case organization seemed to be even a slightly surprised of the amount of development activities, but used a common sense so that they were able to select the most valuable ones from where to start. All in all, the initial proposal didn't face many changes or topic deletions, just a reorganization by the information from the case organization members.

Proposal	
What	Why
<i>Project document templates</i>	The case organization needs updated project document templates to have a harmonious look, same content and to provide support for the process as the project on goes.
<i>Ending the project</i>	Removing the confusion on the last phases of the project needs a structural approach and a guidance how to perform it correctly.
<i>Project Briefcase</i>	Entirety of all projects, ensuring that company's long-term strategy is followed and all the projects work towards the shared goal with the right resources and no decision are missing.
Iterative approach in to use in entire organization	The ideological change should be the change into more iterative and agile way of doing – To be able to respond market challenges and serve customers more efficiently and responding to changes quickly by utilizing tools like MVP.
Agile software development	To stay on the same level as many of the competitors, the software development unit needs to be modern, up-to-date and utilize the latest tools and best practises.
Agile software development methods	Utilizing one methodology like Scrum would be beneficial to whole organization. This would provide support and provide already existing solutions to the challenges that the case company is having.
Mini project model	One concrete solution that would help all the members of the organization to run smaller projects; giving instructions and guidelines what to do even they weren't professional project managers.
Proof of Concept (POC)	Changing the approach to more iterative fashion would provide faster and concrete examples of the possible software to the customer, without a big financial contribution to unknown.
Process descriptions	To remove the gaps on the members of the case organization; lack of awareness of how the project process should go.

Table 13. Reorganized final proposal, part I of II.

Proposal	
What	Why
Model for co-operation	To integrate the different working models in different units for more coherent and efficient organization. Removing existing exceptions by harmonizing rules and developing model to be used in the collaboration between the units.
Yearly planning	Development team members are having issues to know if there are some special requirements or deadlines in the timetable. There is no visibility or transparency between units on the product roadmaps, which should be requirement to Product Marketing.
Starting the project	A few extra days in the start are more beneficial than issues and missing phase during the project. Starting the project requires so many actions to be done, during which there isn't really any real progress reasonable to be expected.
Utilization of the existing source code	Similar features expected to develop all the time, still no utilization of old own existing solutions or readymade -alternatives. Removing the ideology of doing everything self and from the scratch.
Utilization of Scrum	Full utilization of Scrum would remove several CSA-raised challenges and it would bring a lot of required structure and a process model to whole organization, not only to development team members but also to other stakeholders.
Habit of giving feedback	As a part of continuous organizational development and the development of the project management process it is crucial to create an environment where the different information is collected directly and constantly.
Roles in the organization	Flexibility needed in the roles that the organization is using. More flexibility in salaries as well in the role descriptions to open up the old fashioned way of thinking.
Back office	Clarify who is responsible of what and how the needed operations are best to organize.
DevOps	Continuous delivery and co-operation between units could benefit about DevOps in their collaboration by providing tools for the continuous software releases.

Table 14. Reorganized final proposal, part II of II.

### 6.3 Recommendation for Implementation

As in many other organizations, there aren't normally many resources free just for the organizations own development actions. As noticed in proposal validation meeting, the participants struggled with the amount of proposed actions. It is of course up to the case organization what and how many development actions they are ready and willing to make, but the researcher would suggest that further scheduling would be desirable.

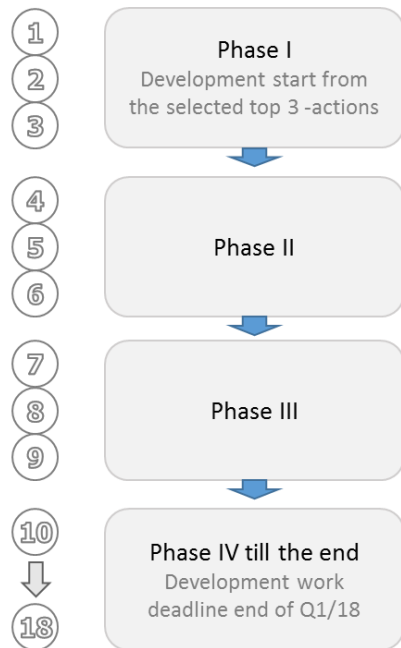


Figure 14. Example of the development schedule.

There are countless ways how the development work could be scheduled. One could be so that the tasks are divided and set into different phases. From the proposal can be found the responsible parties of whom the topic is, so the design of the full implementation of the development tasks isn't completely impossible already at this phase. But the deadline for the work should be set with clear milestones, in the example the deadline was set to 31.3.2018.

## 7 Discussion and Conclusions

The last section discusses about the research in overall, wrapping up the entire research work. What was the objective and what was the outcome, summarizing the whole work and giving reflection how the research work succeeded.



## 7.1 Summary

At the moment the company is having different challenges with the performance of its project delivery's and the organization working in the projects. In the current market situation where the agile development methodologies are valued and required, the challenges are seen on companies where this way of working is still new; it requires different skill set. Therefore, an improved project management process is vital success factor for the needs of the future.

This thesis is about how to make more efficient project management process for the target organization. The recommendations are meant to be used in the Software Development unit and other closely related parts in the whole organization.

The research approach in this study was so that both quantitative and qualitative research methods was utilized during the study, using the mixed methods research design. The research was conducted by interviewing selected project management stakeholders in order to receive their opinion on the current process as well as on the current challenges on this process. For the research method, a case study was selected, which is an in-depth inquiry to phenomenon or topic with real life setting and it can use some combination of for example interviews, questionnaires and documentation for retrieving information about the objective.

The researcher started the study via the current state analysis to have updated information from the organization. The main source of the CSA was interviews and the researcher interviewed 12 employees. Considering the target organization and the business problem, interviews where seen as the most suitable way to collect data. Interviews were semi-structured qualitative interviews. Semi-structured content is suitable for interviewing different people for example in this case where they have different roles and responsibility areas, thus the interview can be altered along the event; it can be rapidly adjusted to the current situation and interviewee. In the end analysis revealed the challenges that the company is having. CSA showed the themes that needed development actions, although some of these were left outside of the scope of the research, focus was set to project management process development from the Project Office and from the project team point of view.

Based on the existing knowledge (literature can be mentioned for example Project Management, Lean, Scrum and Kanban) and the feedback from the members of the organization, the researcher created a listing, a proposal of development activities. The recommended development actions were handled with the members of the Project Office and some prioritization was made. With the feedback from the case organization the researcher was able to finalize his recommendations and provide these to the organization for further actions.

## 7.2 Evaluation of Thesis

This section of the study evaluates the objectives set at the beginning of the thesis and the results. This sections also discusses researcher's reflection to the study.

### 7.2.1 Outcome vs Objective

Thesis Objective is to enhance project management process by eliminating unnecessary phases, improving vital processes in project delivery and discover ways to improve efficiency and collaboration in projects. Thesis will concentrate into issues that are tightly connected to project management process, especially during the project, from Project Office and project team point of view.

Solving this is important because the company needs to ensure its long term survival. That requires enhanced and more efficient use of the resources and the best suitable processes that supports all the needed functions on all units during project or program development life cycle.

Output of the study is a list of recommendations for the use of the whole organization in different projects and project phases. A guideline that gives answers to questions and describes phases for the employees to understand certain phases or helping in creating the bigger picture of the project delivery in the target organization.

### 7.2.2 Reflection & Afterword

This Thesis work started on the autumn of 2015, it has been challenging time occasionally, balancing with the different parts of the life – with the available time. Now in the spring of 2017 it finally seems to be so, that the end is not far.

During the research two things were noticeable. First the interviews. After five interviews it seemed that the approach with semi-structured interview didn't provide so much information that the researcher was hoping to have. So the researcher provided more pre-information about the topic to interviewees (before there was only brief face-to-face discussions) and re-arranged the question order, and by using different themes combining the questions together. Secondly, when processing the CSA material after a long pause, it still seemed to be so that there wasn't that much material to work with than the interviews left to think so. For that there can be several reasons, maybe the researcher didn't have the right questions, maybe the interviewees felt the situation so that their professional capabilities were under investigation or the organization wasn't able to provide right persons, maybe interviewees from another positions would have been giving better results. But as there were limitations like time, there wasn't time to organize new interviews.

The research results showed positive signs in proposal validation meeting, the case organization was surprised that there were so many recommended actions, which I see as a positive, as the research material was challenging. I am satisfied that I was able to provide several recommendations and tools for the target organization – giving them possibility to create more efficient organization.

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## Interview questions

Interview questions used in interviewing the target organization employees. Interviews were semi-structured interviews, so the researcher might not have used all the questions during the interviews.

### INTERVIEW QUESTIONS:

#### *General information*

- Age group:
  - 25-30 / 30-35 / 35-40 / 40-45 / 45-50 / 50-55 / 55-60
- Education
- Work experience in years
- Work experience in the target organization
- Job role
- Team members
- Dealing with which customers?

#### *Miscellaneous project management questions*

- Familiar with the project models?
- Are the project models usable?
- Are the project models flexible enough?
- Can we use the current project management tools efficiently?
- Do you have available support for project management issues when needed?
- Is there need to have more support?
- Could the Project Managers do something different than currently?
- What is the level of current project management process?
- Is the company investing and supporting enough the project management process?
- How well were you acknowledged about the project situation (during the project)?
- How well the information flow between the project team and different units, and stakeholders?
- Did we receive enough information from the Customer during the project?
- Own and team's knowledge-level about the project management process?
- Customers feedback about the process?
- Team member's feedback about the process?
- Other feedback from the team about the process?
- How is the work organization (resources) working between project work and team's work?
- Is it efficient and functional?
- How well the developers know what is expected from them?
- Is the creation of work estimates functional?
- How could it be more accurate?
- What are the problems with current project management process?
- What are the reasons behind the issues?
- What is the biggest issues at the moment with the process?
- What is working well at the moment?
- What could be the development targets in the process